STUDIO 7 Service Manual

Edition Note

This is the first edition of the Studio7 Service Manual. Subsequent updates or revisions will be announced on this page.

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CHAPTER 1

THE BASICS

This manual explains testing and replacement procedures for the Ioline Studio7. You will be shown how to isolate mechanical and electrical subsystem failures to the assembly level and how to replace failed assemblies. This manual also includes procedures showing ways to isolate electronic subsystem failures to the circuit board level and how to replace failed circuit boards.

YOUR COMMENTS ARE REQUESTED

This manual is provided for informational purposes only. The contents are subject to change without notice and the Ioline Corporation assumes no responsibility for any errors that may be contained herein. No part of this manual maybe copied, disseminated, or distributed without the express written consent of the Ioline Corporation.

Ioline Corporation values your comments on our documentation. Please send your corrections or suggestions to Ioline Corporation, 12020-113th Ave. N.E., Kirkland, WA 98034. USA. ATTENTION: CUSTOMER SERVICE MANAGER

CAUTION

Before you go to the quick testing and replacement procedures that are explained in chapter 5 of this manual, please read the safety guidelines that are explained below.

WARNINGS AND CAUTIONS

>>>>>Warning: Warnings call your attention to safety procedures that must be followed in order to avoid potential personnel injury.

>>>>>Caution: Cautions call your attention to procedures that must be followed in order to maximize equipment performance and avoid a loss of equipment effectiveness.

BASIC SAFETY GUIDELINES

-Comply with the following safety guidelines in order to prevent electrical shock and other injuries:

-Only qualified service personnel should attempt any of the subsystem testing or replacement procedures that are described in this manual.

-All subsystem testing or replacement procedures must be performed with the Studio7 turned off and the power cord removed to avoid the possibility of electrical shock.

-Before you begin any subsystem testing or replacement procedure, make sure that the Studio 7 is on a flat, sturdy, clean, dry surface.

-Keep your fingers and clothing well clear of the grit shaft whenever you are testing the Studio7.

-Ground yourself to prevent electrostatic damage to electronic components.

LIMIT OF LIABILITY STATEMENT

It is the responsibility of the operator of the Studio7 to monitor the performances of the Studio 7 and maintain it in proper working condition by following the instructions in this manual. It is the responsibility of the operator of the Studio7 to follow all safety precautions and warnings that are described in this manual. Ioline is not responsible for injuries that may occur as a result of unsafe operating procedures. Ioline is not responsible for degraded performances as a result of failure to maintain the Studio7 as described in this manual.

TOOLS AND EQUIPMENT

All of the tools and equipment that you need to perform the testing and replacement procedures in chapter 5 of this manual are listed below.

-Number 1 and number 2 Phillips head screwdrivers
-Flathead screwdriver
-Small flathead screwdriver
-Needle nose pliers
-9/64" hex wrench
-5/64" hex wrench
-9/64" t-handled hex wrench
-1/8" square drive
-U-joint socket driver
-Exacto knife
-Double back tape
-Voltmeter
-Static strap

IOLINE WARRANTY POLICY

Ioline Corporation provides a 15 month parts and labor warranty on all new equipment and 90 days on parts unless specifically noted otherwise. Every unit is recorded by serial number when it leaves the factory. If the serial number indicates the unit exceeds 15 months old, then the user must provide proof of extended warranty.

For warranty service, the end user must work through their dealer. Ioline Customer Service is available to assist Authorized Dealers in the performance of their support duties. A customer contacting Ioline Corporation directly will be sent back to their dealer.

SERIAL NUMBER IDENTIFICATION

Identification of Ioline Corporation products is accomplished by the use of a serial number. You can determine the make, model, and date of manufacture by viewing this serial number. The serial number is located on the back of the plotter.

Example: V60940199

V = Make
60 = Model
94 = Year
01 = Week of manufacture
99 = Number of plotters made that week

CHAPTER 2

BRIEF DESCRIPTION

The Ioline Studio7 is primarily a sign cutting plotter. The Studio7 is used to cut backed material like vinyl. Also, using the Banner Adapter, customers can print large banners. The Studio7 comes with a check plot pen set. These pens are used to check graphics output before cutting expensive vinyl films.

HOW THE STUDIO7 WORKS

The Studio7 enables movement of a tool along two axes, the X-Axis (media movement) and the Y-Axis (tool movement). The Studio7 gritshaft and chart wheels produce X-Axis motion by moving the media beneath the carriage. The carriage moves along the Y-Axis on the traverse rods and can accommodate a variety of tool attachments. Up and down movement of the knife and Banner Adapter is done with a small solenoid, and the electronic subsystem.

MEDIA MOVEMENT

The X-Axis transmission powers the grit shaft and transports media along the X-Axis of the Studio7. The chart wheels (mounted on the square shaft) press the media against the grit shaft and the grit shaft pulls the media under the carriage. The chart wheel surfaces are designed with a slightly conical shape. This design feature acts to pull the media out toward the sides of the Studio7 while at the same time pressing the media down into the grit shaft. This keeps the media taut and wrinkle free.

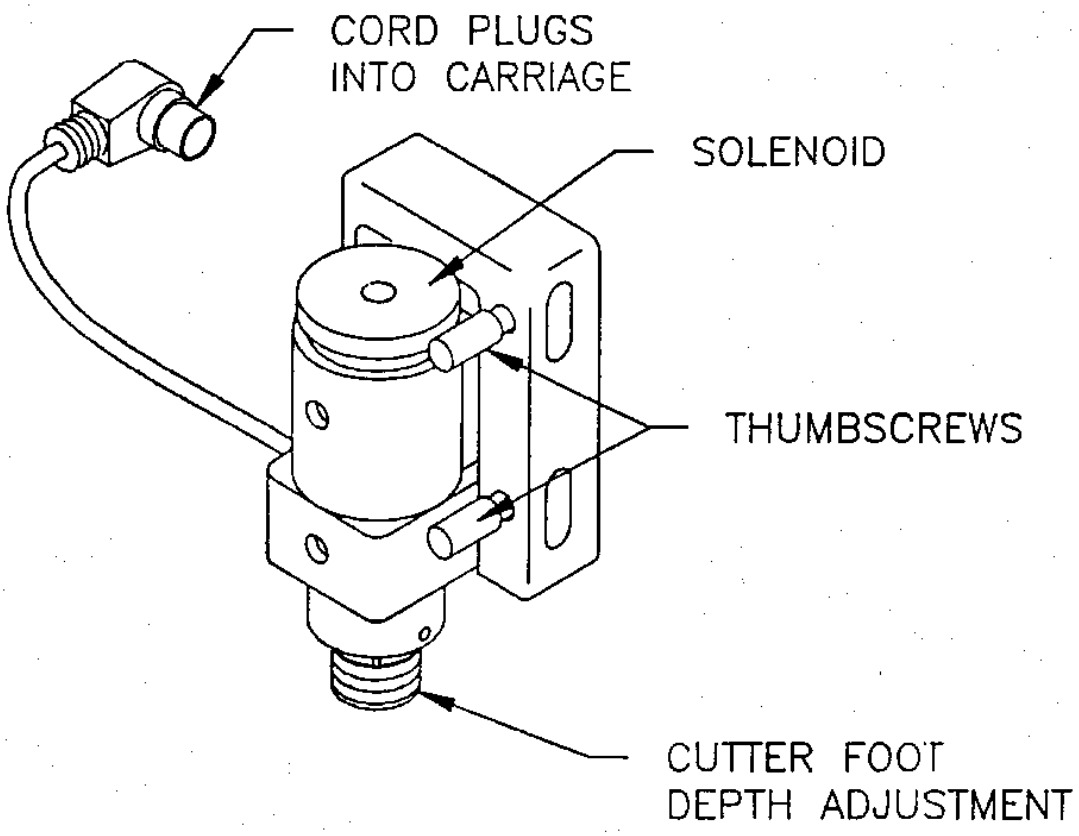
The chart wheels are activated with a lever mounted on the left side of the plotter.

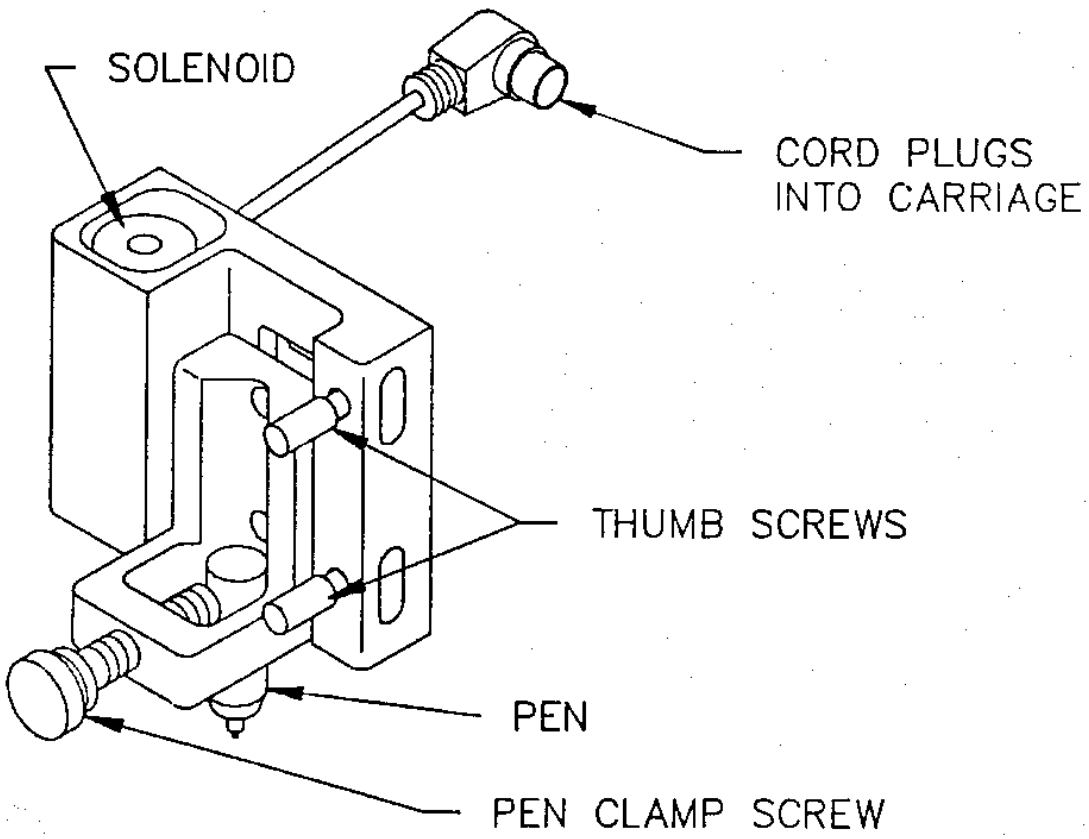
TOOL MOVEMENT

The Y-Axis transmission powers a belt that transports the tool along the Y-Axis of the Studio7. The cutter or banner adapter is attached to the carriage. The tool is then pulled along the Y-Axis, above the surface of the media.

TOOL LIFTING AND LOWERING

Up and down movement is actuated by a small solenoid that receives a signal from the logic board.

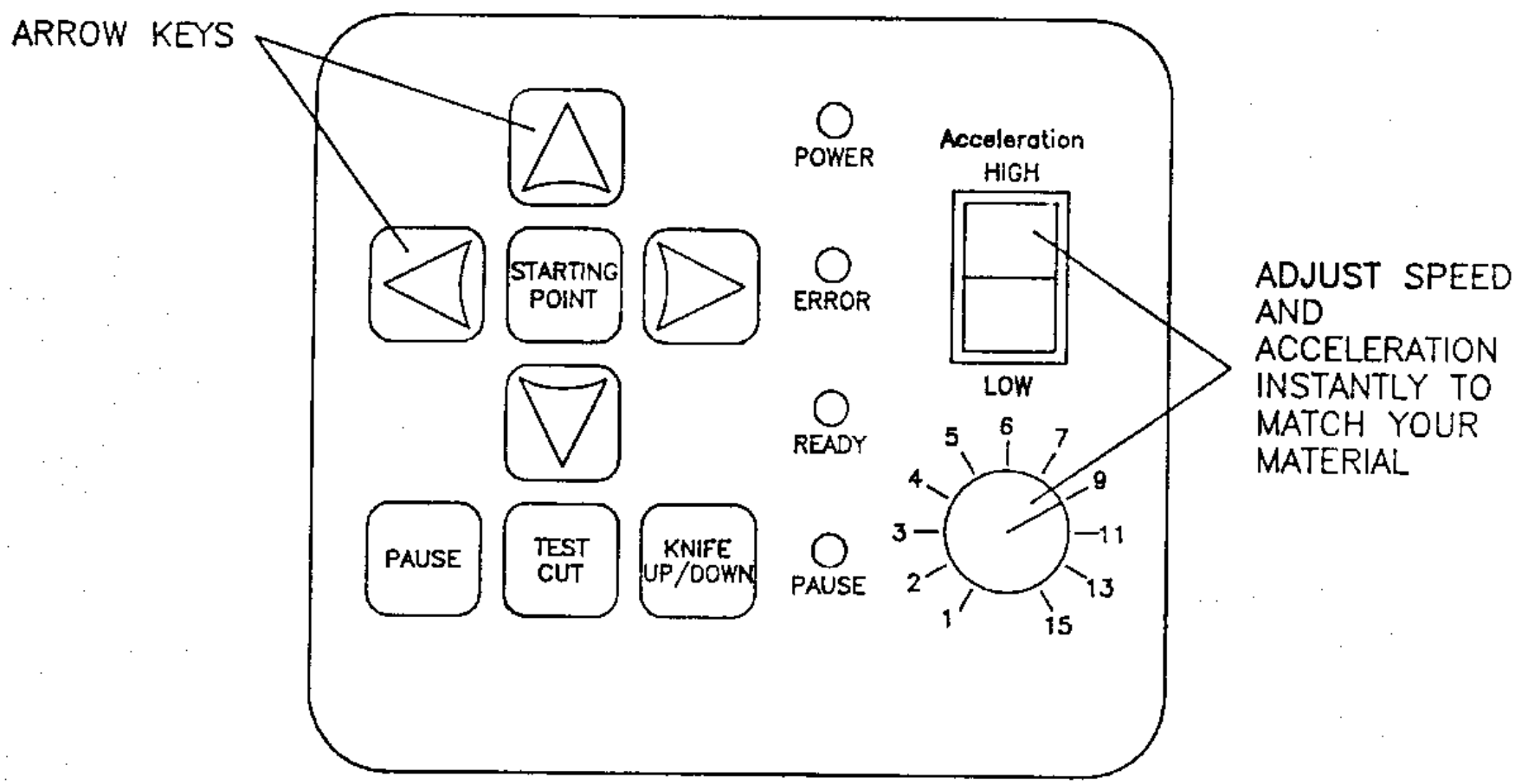




KEYBOARD LAYOUT

The keypad was designed to be easy to operate. The keypad has 4 arrow keys which move either the media or the tool. In the center is a key that says STARTING POINT. When this key is pushed it tells the plotter this point is 0,0 (or LL). In the lower right corner of the keypad there is a knob that selects up to 15 different speeds. Above the knob is a two position rocker switch. This switch allows the user to select a high or low range of acceleration.

Starting at the lower left corner of the keypad are three buttons. The first is the PAUSE BUTTON. The pause button has two duties. First, it places the plotter on-line and second, it allows the plotter to pause during operation. The next button, activates a Test Cut. This test cut allows the user to set the tool for proper depth. The next button, KNIFE UP/DOWN, is used to make the tool manually rise or lower.



SPECIFICATIONS:

DRIVE METHOD	Pinch-roller/friction
DRIVE TECHNOLOGY	Servo
COMMAND LANGUAGES	HP-GL 7475, 7596, DM/PL
CUTTING SPEED	User adjustable-1 to 15 ips (2.5 to 38cm/s)
ACCELERATION	User adjustable-0.10 to 1.0g
CUTTING FORCE	150-200-250-300gr
BLADE DEPTH	User adjustable, 0-50mil
BLADE OFFSET	User adjustable, 15 mil default
PANEL SIZE	User adjustable to 838-inches-long
MATERIAL SIZE	Variable-36 inches-wide to 2 inches (914mm to 51mm)
MEDIA FORMATS	Punched, unpunched, rolls or sheets
DISTANCE ACCURACY	0.1% of move, or 1 mil within an 80 inch panel, whichever is greater
REPEATABILITY	1 mil within an 80-inch panel 25 mil panel-to-panel
INTERFACE	Standard RS-232C
BUFFER	1 megabyte
DIAGNOSTICS	Self-test and communication confirmation
POWER SUPPLY	Universal or 100/120/220/240Vac, +10%; 47/63 Hz
DIMENSIONS(WxDxH)	50x28x50 in with metal stand (1270x712x1270mm)
WEIGHT	60 lbs (28kg); stand 47 lbs. (22kg)

ENVIRONMENTAL RANGE

Operating temperature: 0-35 C.

Relative Humidity: 30%-90%

COMMUNICATION

Interface: Asynchronous serial RS-232-C, DB-25S connector, requires DB-25P mating connector on the cable.

Baud rate: 9600

PC Communication Protocol: 8 data bits, no parity, 1 stop bit.

Macintosh communication protocol: 8 data bits, no parity, 2 top bits.

CABLE IDENTIFICATION

Pin number	signal	Signal Direction
1	Chassis ground	Shield 9 (if available)
2	Transmit data to host	From plotter
3	Receive data from host	To plotter
4	Request to send	From plotter
5	Clear to send	To plotter
7	Signal ground	N/A
20	Data Terminal Ready (DTR)	From plotter

REPRESENTATIVE MATERIALS CUT WITH STUDIO7

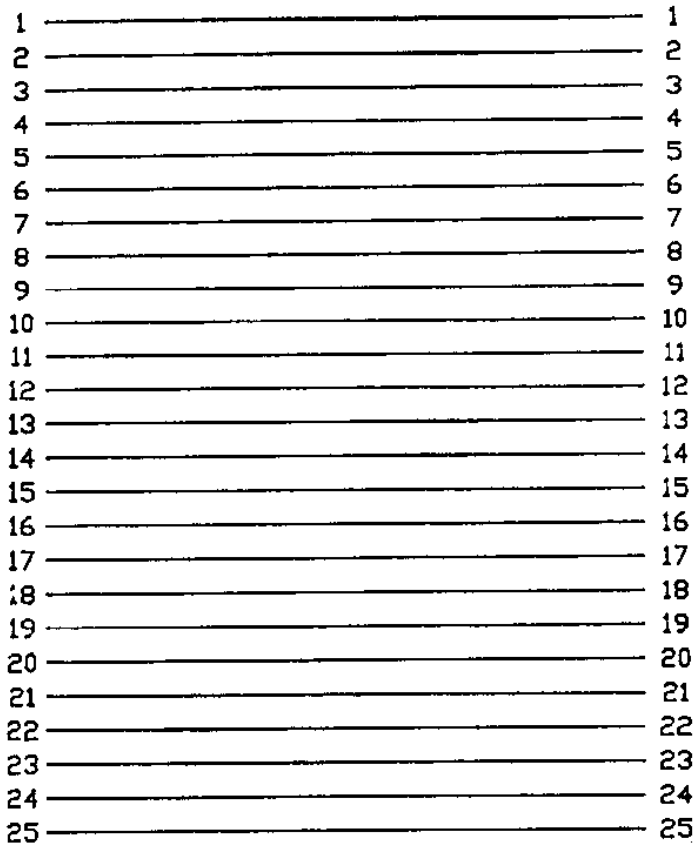
High-performance vinyl
Intermediate-grade vinyl
Engineering/economy-grade vinyl
Rubberized sandblast resist
Vinyl-based sandblast resist
Metallics
Matte films
Polyester films
Rubylithe/amberlithe
Reflectives
Translucents
Stencil mask

MANUFACTURERS

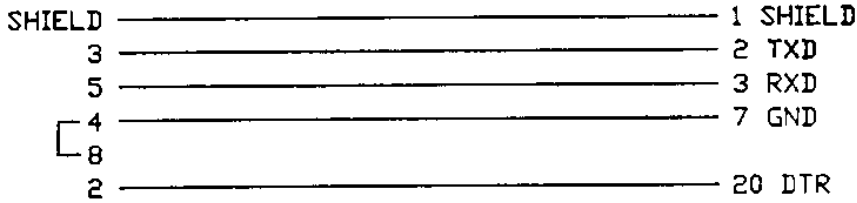
3M
Arlon
Avery
Anchor Continental
Flexon
Hartco

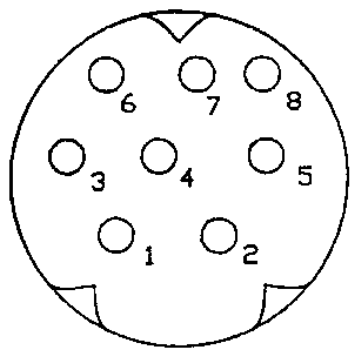
Test cuts were successfully performed with a range of materials from the above listed categories. Material characteristics vary significantly within these categories.

CABLE CONFIGURATION



PC COMMUNICATIONS CABLE





MACINTOSH COMMUNICATIONS CABLE

CHAPTER 3

PART IDENTIFICATION

1) **BOTTOM PAN:** Metal housing protects the underside of the plotter. Attaches to the stand.

2) **CARRIAGE:** The unit that holds the knife and travels along the Y-Axis rods.

3) **CHART TAPE:** Slick tape located under the blade to cushion and protect the platen if it runs off the vinyl.

4) **CHART WHEELS:** A pair of roller wheels that push the vinyl against the grit shaft.

5) **GRIT SHAFT:** A traction roller bar designed to grip and move material under the chart wheels.

6) **KEYPAD:** Where the user controls the functions or set up the plotter.

7) **KNIFE FOOT:** Adjusts the cutting depth. Counter clockwise turns off the foot exposing more blade for deeper cutting.

8) **MEDIA GUIDE:** To assist vinyl tracking in a straight line.

9) **PLATEN:** Black staircase surface at the front and back over which the material moves.

10) **POWER ENTRY MODULE:** Where the power cord plugs in.

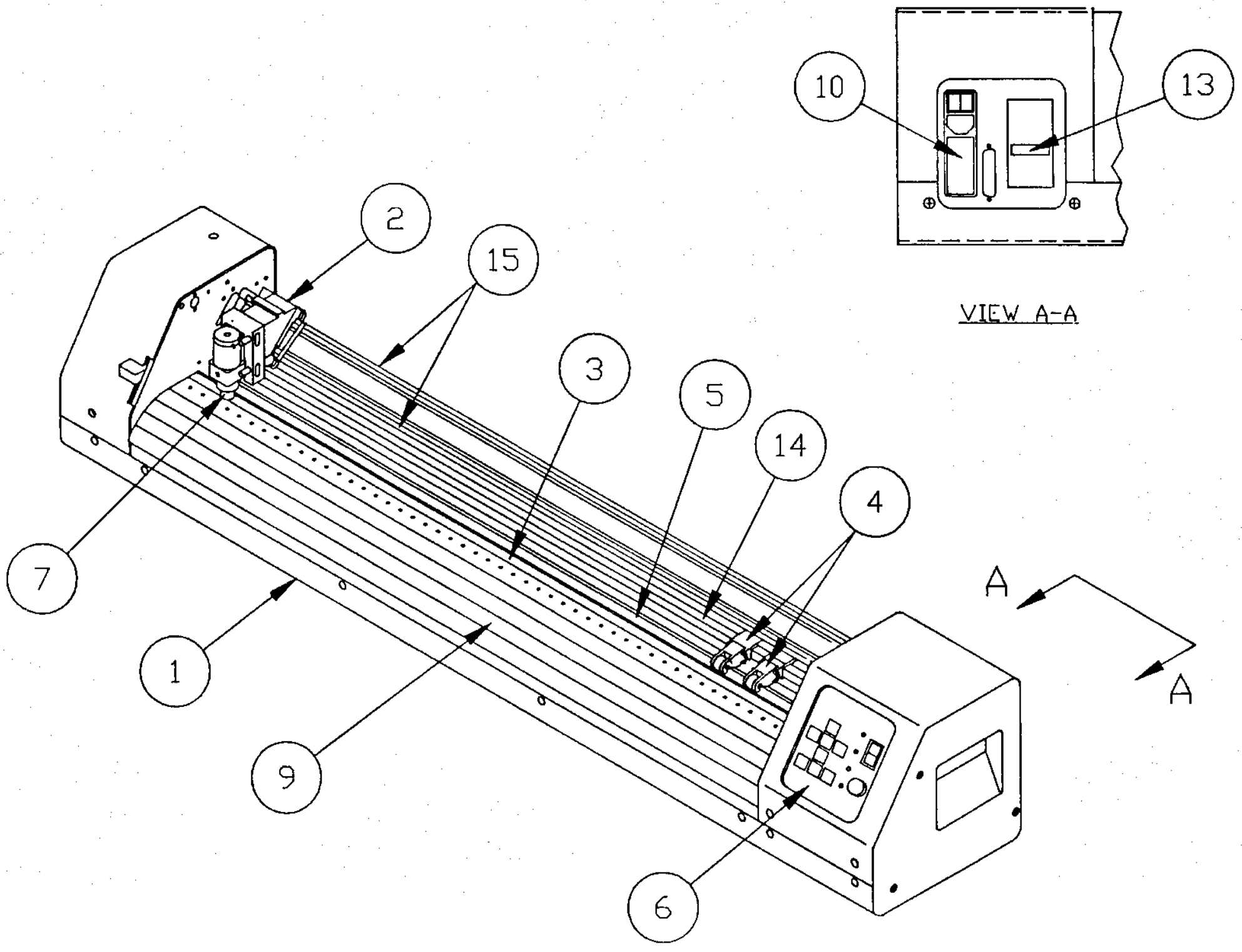
11) **RS 232 CABLE:** PC Data cable connecting plotter to the computer.

12) **RIBBON CABLE:** Carries data from the logic board to the carriage with instructions how to move along the Y-Axis.

13) **SERIAL NUMBER:** Used to identify the make, model, and manufacturing date of the plotter.

14) **SQUARE SHAFT:** Shaft running through the chart wheels. Raises/lowers to allow proper tension on the material. Located below the traverse rods.

15) **TRAVERSE RODS:** Two metal rods carrying the carriage along the Y-Axis.


10
13
VIEW A-A
2
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14
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CHAPTER 4

CONTROL CENTER

The Studio7 Control Center is a DOS, Windows and Macintosh compatible program that comes on a diskette with your Studio7. It has three functions:

- Allows adjustment of Studio7 settings.
- Allows you to send a completed plot file to the Studio7.
- Includes several diagnostic tests for troubleshooting and test files.

CHANGING YOUR SYSTEMS SETTINGS

Your Studio7 must be in Ready mode when you change system settings. Press the Pause key and make sure the green (Ready) light is on before you change any settings.

Note: You will probably never need to change any of the factory (default) settings. However, we have provided you with the ability to customize a variety of settings to fit your exact needs.

INSTALLING THE STUDIO CONTROL CENTER

The Studio7 comes with three diskettes. Each diskette contains the entire Studio Control Center program. Both DOS and WINDOWS versions of the program are on 5.25" and 3.5" diskettes. The MACINTOSH version of the program is on a single 3.5" diskette.

With the DOS and WINDOWS versions of the Control Center program you can use either a mouse or the keyboard of the computer to change the default plotter settings. If you use the keyboard, note the following rules:

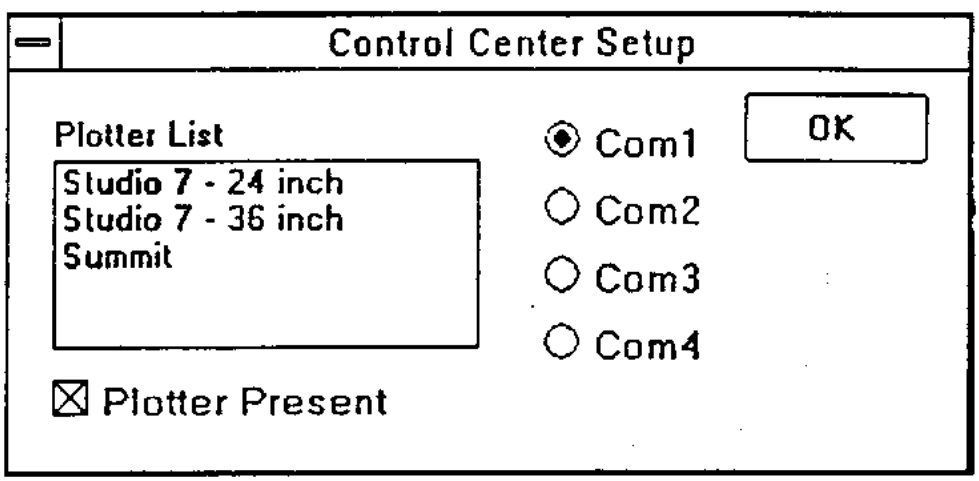
-Use the Tab key to circle through the menu fields.
-Use either the up/down cursor movement keys or the numeric keys to change a numeric value within a highlighted menu field.
-Use the Alt key to toggle between the menu fields and the pull down menus.
-Use the Enter key to select a highlighted field.

DOS Installation

Install the Control Center program in the following manner:

1) Turn on you computer and the plotter.
2) Insert the DOS version of the Control Center diskette (5.25" or 3.5") into your floppy disk drive of your computer.
3) Your computer screen should say this: C:\>
4) Now type (depending on the letter assignment of the diskette drive you are using) either, A:DINSTALL <Enter> or B:Dinstall <Enter>
5) Follow the instructions that appear on your screen. The Control Center program will install itself in a sub - directory (called SCC) on your hard disk.
6) When the installation is finished, reboot your computer by simultaneously pressing the Ctrl, Alt, and Del keys on your keyboard. This will complete the installation procedure by placing the SCC sub-directory in your computers path.
7) Now type, CD\SCC<Enter>
8) Now type, SCC

You will see this Control Center Setup screen:



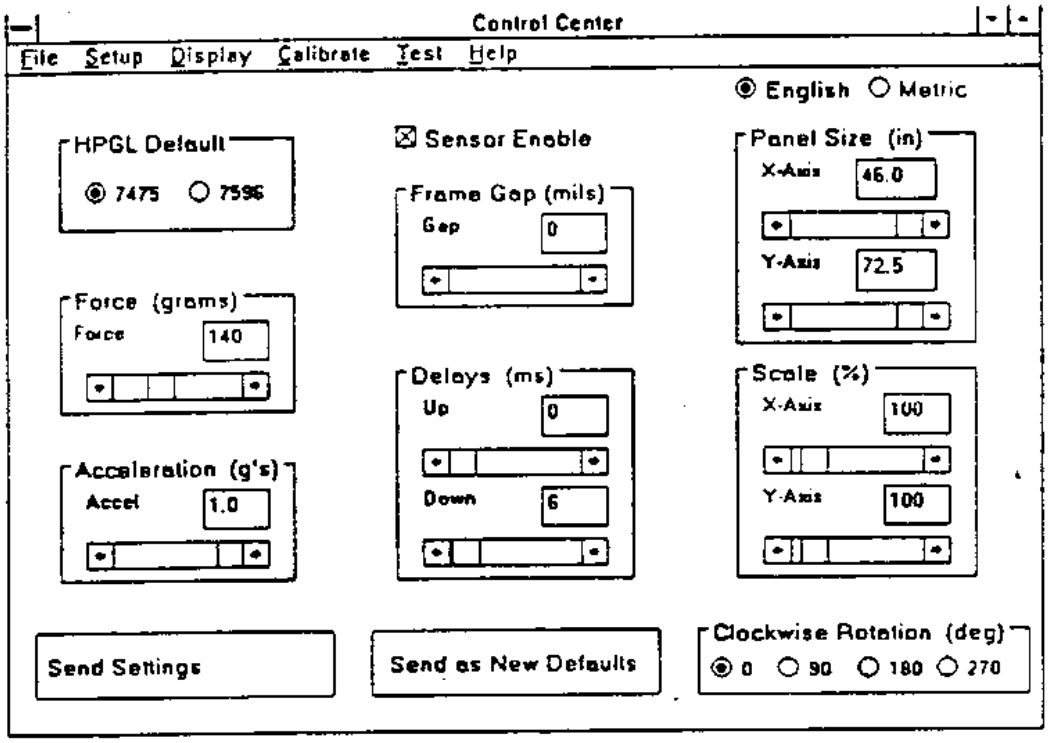
9) Select Studio and the communication port that you are going to be using to send marker plot files to the plotter. Com2 is the default communication port selection.
10) Select PLOTTER PRESENT.
11) Select OK.

WINDOWS Installation

Install the Control Center (on a computer that is running WINDOWS) in the following manner:

1) Turn on your computer and the marker plotter.
2) Launch Windows on your computer.
3) From the Windows Program Manager select FILE>
4) Select RUN.
5) Insert the WINDOWS version of the Control Center Diskette (5.25" or 3.5") into the floppy disk drive of your computer.
6) Now type (depending on the letter assignment of the diskette drive your are using) either, A: WINDOWS\WINSTALL <OK> or B:WINDOWS\WINSTALL <OK>
7) Follow the instructions that appear on your screen. When the WINDOWS installation is complete, you will see the Control Center Setup screen. Select Studio and the communication port that you are going to be using to send marker plot files to the plotter. Com2 is the default communication port selection.
8) Select PLOTTER PRESENT.
9) Click on <OK>. You will see the Control Center screen.

You will see this Summit Control Center screen:



MACINTOSH Installation

Install the Studio Control Center on a Macintosh computer in the following manner:

1) Turn on your computer and the Studio plotter.
2) Insert the Macintosh version of the Control Center diskette into the disk drive of your computer.
3) DRAG the entire contents of the diskette to the hard drive of your computer. Open your hard drive.
4) Double click on the SCC Icon. The Control Center is now open.
5) Read the installation notes and follow the instructions that appear on your screen.

TESTING

There are three tests that can be performed from this menu item.

Serial Test
Turn on the Studio7 while holding down the TEST CUT key until it beeps and flashes lights three times. If it does this correctly, serial communications are established. If there are no beeps or flashes, check the communication protocol and perform the next two tests.

Computer Port Test
Disconnect the Studio7 from the computer and connect the diagnostic module to the computer port. This diagnostic module will cause output data sent from the computer port output to be "looped" to the computer port input. Follow the instructions on the computer screen.

Plotter Port Test
Connect the diagnostic module to the Studio7 port. Turn the Studio7 on while holding down the TEST CUT key. Lights will flash and beep three times

Press any arrow key on the plotter keypad to send and receive a character. Verify it beeps and flashes the error light.

If the error light beeps and flashes, the port is good. If it does not, contact Ioline Customer Service for a replacement port.

HPGL 7475 OR 7496 Plotter Language/DMPL

Your Studio7 supports three industry standard plotter languages:
HPGL 7475, HPGL 7596, and DMPL. HPGL stands for Hewlett Packard Graphics Language and DMPL stands for Digital Microprocessor Plotter Language. Your Studio7 will automatically switch from DMPL to HPGL (7475 or 7596) and vice versa. If your sign-making software uses HPGL, you must select the version (7475 or 7596) of HPGL that your software uses by clicking in the circle.

HPGL 7475 is the plotter default language. It has a lower left origin and it is the most commonly used language. A lower left origin means your Studio7 begins plotting from the lower left (keypad side) and measures everything from this location.

The Studio7 also supports HPGL 7596. This is a plotter language with a center origin and is less commonly used. A center origin means your Studio7 begins plotting from the center of the panel and measures everything from this location.

Panel Size

Sign-making software creates long signs by dividing them into smaller, more manageable panels. The default panel size of your 91 cm (36 inch) Studio7 is 1.9 cm (80 inches) long by 89 cm (34.9 inches) wide. The default panel size of your 61 cm (24 inch) Studio7 is 1.9 cm (80 inches) long by 59 cm (22.9 inches) wide. You may select a larger panel size by moving the scroll box. The maximum panel size is 2128. cm (838 inches) on the X-Axis.

Scale

The default scale is 100%. The Studio7 will produce a cut in the exact size of the plot file. If you set the scale to 50%, your Studio7 will produce a cut half size. You can set the scale of your Studio7 from 1% to 999%.

Up/Down Delays

The default up and down delay settings are both 50 milliseconds (ms). The Studio7 knife takes 50 milliseconds to raise up from, or lower into, the media at the end of each segment of the cut. A shorter up and down delay setting will make the knife move faster but it could also reduce the quality of the cut.

Acceleration

The default high acceleration settings is 1.0 g and the default low acceleration setting is 0.5 g. The acceleration setting determines how quickly the knife will reach full speed when starting or ending a cut line. Generally, you will use the high acceleration setting when you use a faster speed setting. You can select high or low acceleration from the keypad. You can use the Studio7 Control Center to change either the high or low settings within a range of 0.1 to 1.0 g. Normally, you will not adjust this setting.

Blade Offset

The default knife offset is 15 mils. Because the cutting edge of the blade is slightly behind the center point of the cutter foot, the center point is offset slightly to compensate. This slight compensation or offset allows the Studio7 to produce consistently accurate cuts. This setting must match the actual offset of the blade. For a standard blade, the offset is 15 mils.

Knife Overcut

The default knife overcut setting is 10 mils. Knife overcut is your Studio7's way of making sure that each cut actually reaches the point where one cut line meets or overlaps another cut line. Knife overcut is the distance the knife travels beyond the end of each segment of the cut. This ensures that all of the pieces of your sign will be cut completely, with no bridges.

Knife Angle

The default angle setting is 45 degrees. This is the minimum angle for which your Studio7 knife will perform a knife steering arc.

Send Settings

After you have changed any setting, you must send the changes to your Studio7. If you choose this menu selection, the Studio7 will use the new settings. You may also save your settings to a file and send them to the Studio7 at a later time. Select "File" from the main Control Center Menu to use this option. When you turn off the Studio7, these settings will be lost and the factory default setting will be in effect when you turn on your Studio7 again.

Send As New Defaults

If you choose this menu selection, all the displayed settings will be sent to the Studio7 and they will be saved by your Studio7 for all subsequent sessions, even after you turn off the Studio7.

Calibration

The purpose of the calibration section of the settings menu is to generate and then measure a calibration plot so you can test the accuracy of the X-Axis and Y-Axis measurements produced by your Studio7. You can then adjust the Studio7 for increased accuracy.

To calibrate the Studio7:

1)Select CALIBRATION. If you have a 36 inch Studio7 make sure your media is at least 42 inches long by 30 inches wide, and use a representative material most commonly used. If you have a 24 inch Studio7 make sure your media is at least 42 inches long by 24 inches wide.

2)Select CALIBRATION PLOT. If you have a 36 inch Studio7 it will cut four ruled lines: 40 inches (101 centimeters) long and 28 inches (71 centimeters) wide. With a 24 inch Studio7 it will cut four ruled lines: 40 inches (101 centimeters) long and 20 inches (50 centimeters) wide. Precisely measure one length and one width line (either inches or centimeters and record your results.

3)Select Set CALIBRATION.
4)Enter the measured x value.
5)Enter the measured Y value.

The Studio7 is now re-calibrated.

Only use RESET CALIBRATION if you want to restore original factory calibration settings.

CHAPTER 5

REPAIR TESTING

This section contains instructions for replacing failed assemblies. There are also testing procedures to help determine which assembly has failed. All of the procedures are keyed to at least one illustration. The following procedures are explained and illustrated.

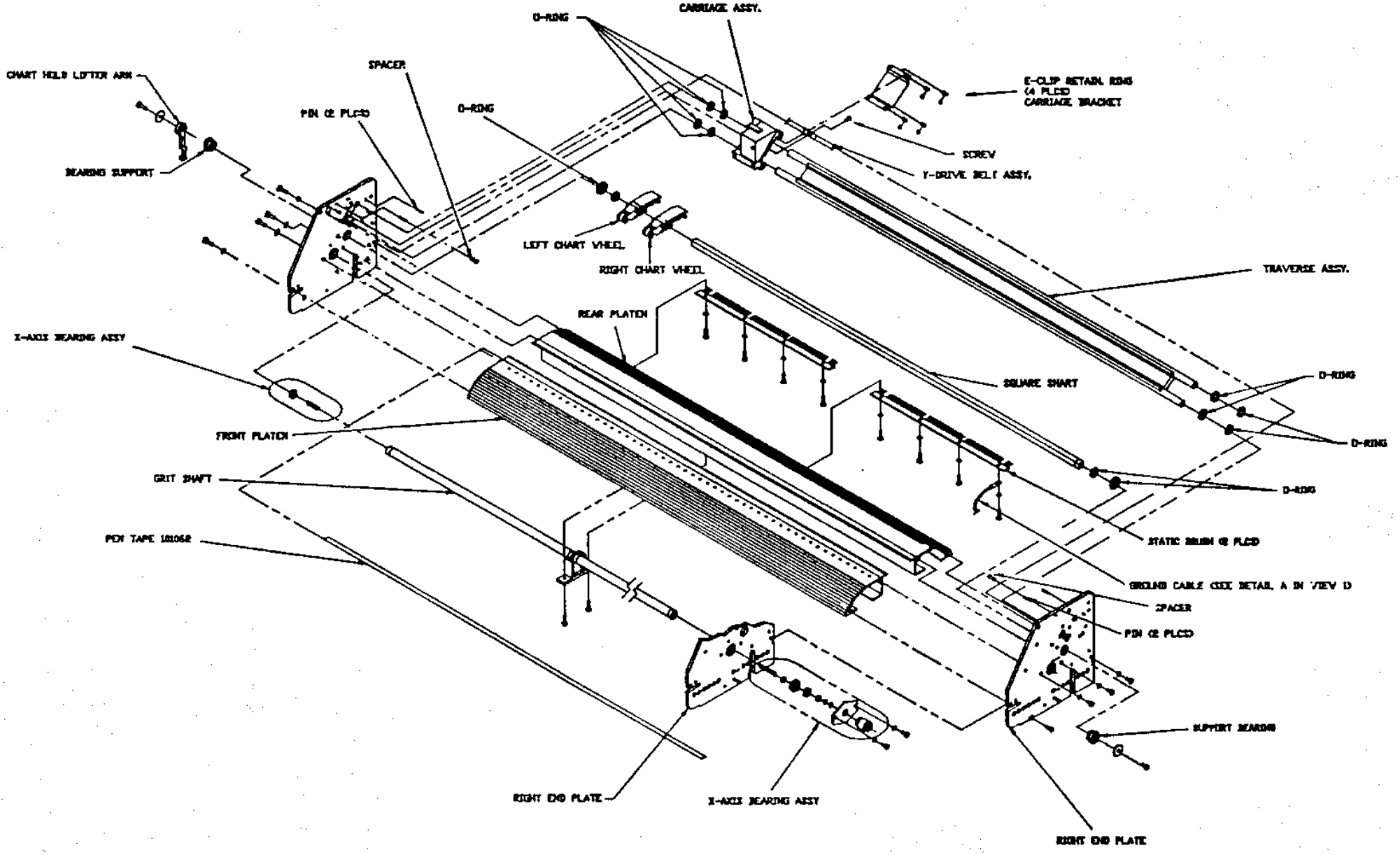
- Tool Carriage Subsystem Replacement
- Knife Functionality Test
- MegaBuffer Board Replacement Procedure
- Y-Axis Transmission Assembly Replacement
- Y-Axis Belt Replacement
- Gear Lash Adjustment for both Y and X Axis
- X-Axis Subsystems
- Grit Shaft Replacement
- Chart Tape Replacement
- Electrical Subsystem
- Power Supply Test
- Power Supply Replacement
- Electronic Subsystem
- Main Logic Board Replacement
- Keypad Replacement

TOOL CARRIAGE SUBSYSTEM

The tool carriage replacement procedure is as follows:

1) Turn off the Studio7 and disconnect the power cord.
2) Disconnect any interface cables.
3) Lift up the dust cover
4) Unscrew the three screws on the left end cap on the Studio7 and remove it.
5) Using the 9/64" hex wrench, loosen the tool carriage belt tensioner.
6) Use a small flat head screwdriver to remove the four e-clips on the backing plate on the tool carriage.
7) Remove the backing plate.
8) Put a piece of tape on the ribbon cable to prevent it from retraction into the plotter.
9) Disengage the cable connector on the carriage and remove the ribbon cable from the carriage.
10) Pull the top of the carriage from the upper traverse rod and then pull the bottom of the carriage away from the lower traverse rod.
11) Unscrew the carriage belt retaining screw on the back of the carriage.
12) Reverse the above steps to install the new tool carriage.
13) Using the belt tensioner tool available from Ioline, set the belt tension at 300-420 grams.

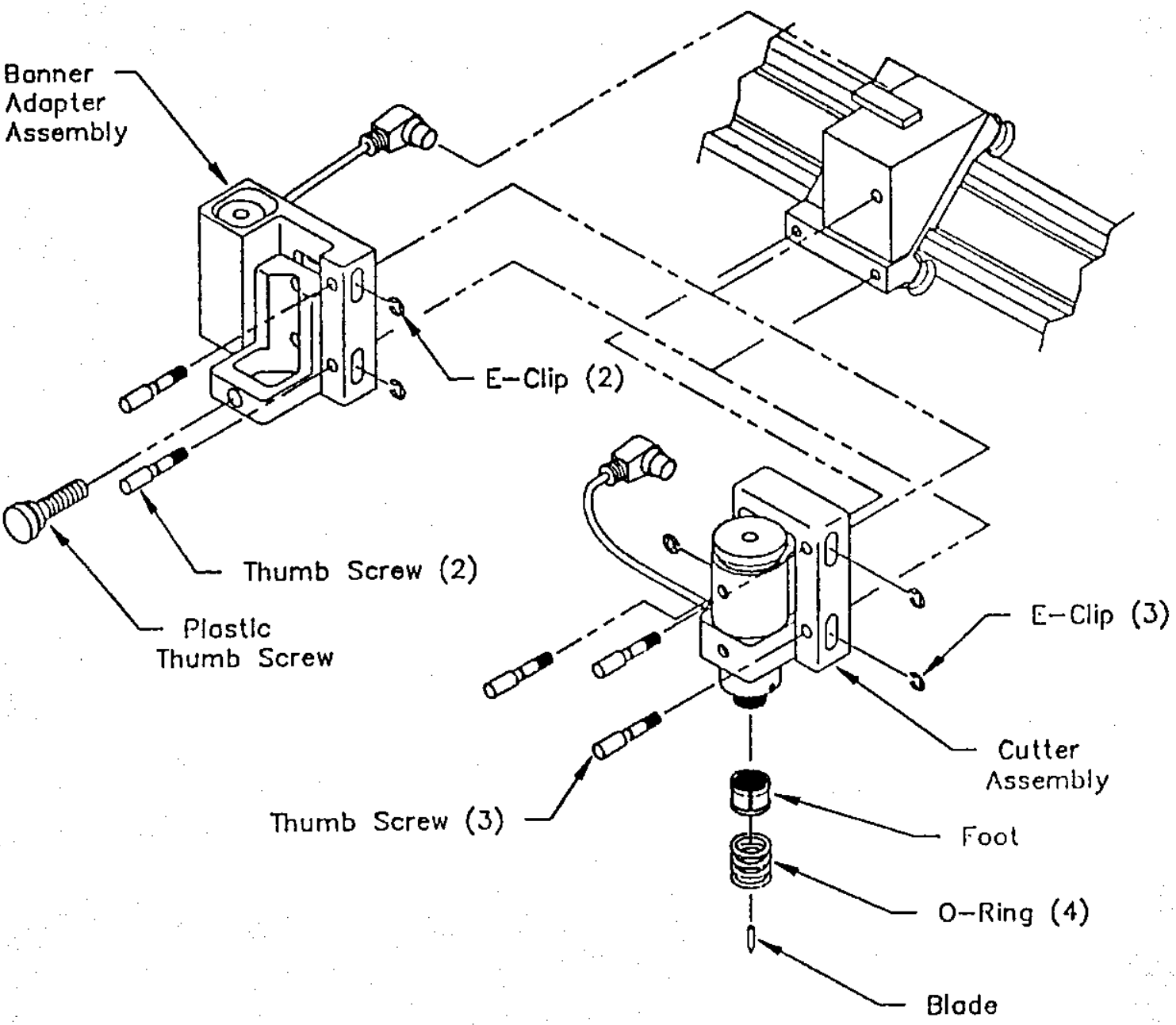
Exploded View



KNIFE FUNCTIONALITY TEST

1) Install the blade in the cutter assembly, screw on the foot counterclockwise.
2) Install the cutter assembly onto the tool carriage with the three thumb screws and plug the cutter into the carriage din jack.
3) Load a piece of vinyl in the plotter.
4) Turn the Studio7 on.
5) Set the cutter on the media, push the STARTING POINT key, and push the Test Cut key.

Tools



MEGABUFFER REPLACEMENT PROCEDURE

Follow this procedure to replace the megabuffer board.

Note: Electronic assemblies are sensitive to static discharge. Be sure to eliminate any build of static electricity by touching a piece of grounded metal before you touch an electronic assembly, or wear static discharge equipment, grounding it before you start.

1) Turn off the Studio7 and disconnect the power cord.
2) Disconnect any interface cables.
3) Remove all the screws holding the bottom pan on the plotter.
4) Remove the bottom pan and locate the megabuffer board on the main logic board.
5) Remove the 4-40 screws holding the megabuffer board to the main logic board.
6) Gently pull the megabuffer board 64-pin receptacle away from the main logic board 64-pin connector.
7) Remove the old megabuffer board.
8) The new megabuffer board 64-pin receptacle is located at the edge of the board. Use this edge as the left-hand orientation of the daughter board. Align the left row of the 64-pin receptacle on the bottom of the megabuffer board with the left row of the 64-pin connector on the Studio7 main logic board. Gently roll the 64-pin receptacle on to the right row of the 64-pin connector. When the pins are correctly lined up, firmly press the connector onto the receptacle.

>>>>>Warning: You must accurately align the 64-pin receptacle with the 64-pin connector. If you do not precisely align these pins you may cause permanent damage to the megabuffer board and/or the Studio7 main logic board.

9) Use the four 4-40 mounting screws to fasten the new megabuffer board to the Studio7 main logic board.
10) Make sure all wiring and cabling is secured and reinstall the bottom pan and the screws removed in Step 3.
11) Reconnect the power cord and all interface cables.

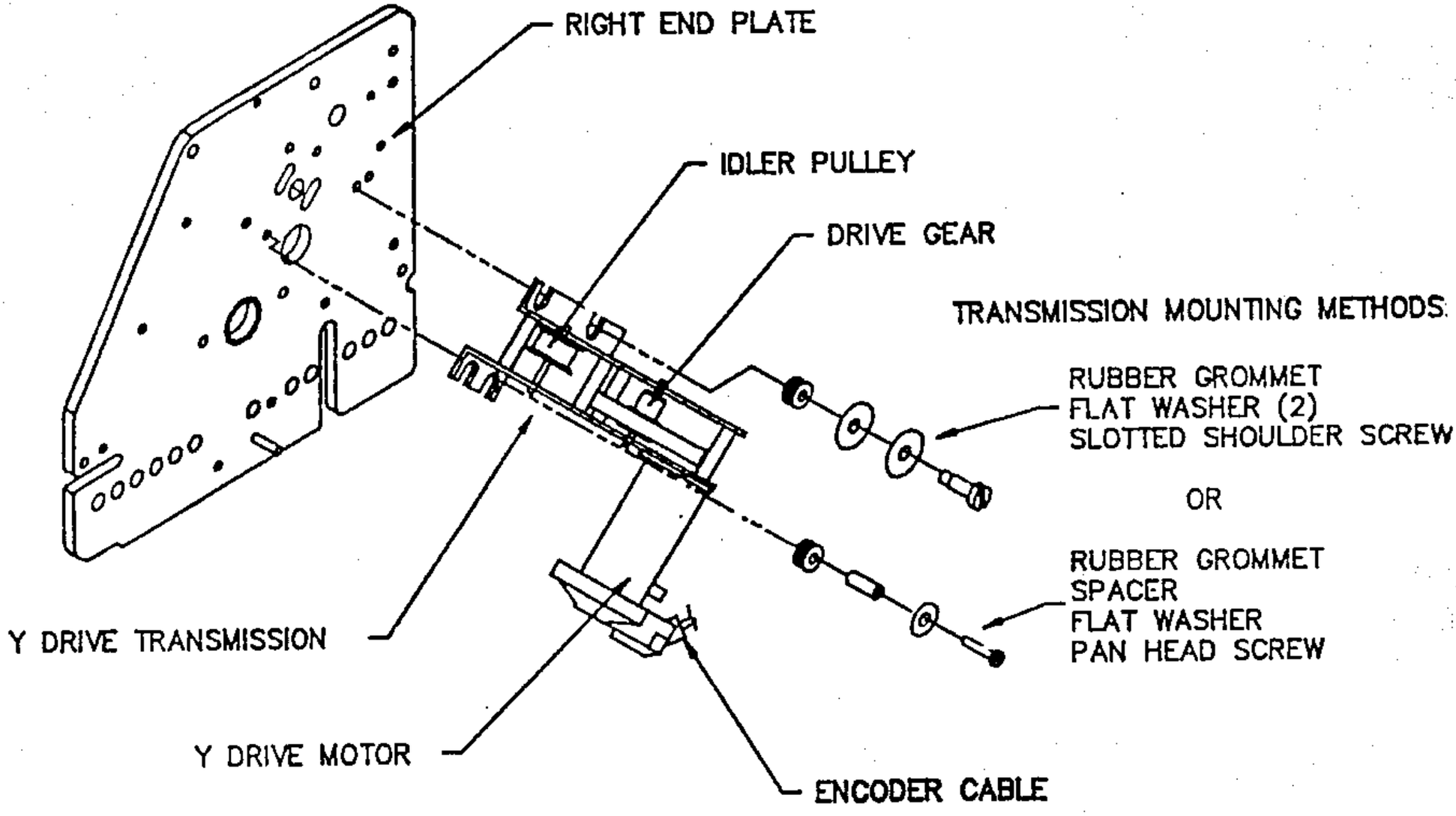
Y-AXIS TRANSMISSION ASSEMBLY REPLACEMENT

Follow this procedure to replace the Y-Axis transmission assembly.
Note: Electro-static discharge preventative measures must be adhered to during all assembly replacement procedures.

1) Turn off the Studio7 and disconnect the power cord.
2) Disconnect any interface cables.
3) Lift up the dust cover.
4) Unscrew the three screws on the left end cap on the Studio7 and remove it.
5) Using the 9/66" hex wrench, loosen the tool carriage belt tensioner.
6) Use a small flat head screwdriver to remove the four e-clips on the backing plate on the tool carriage.
7) Remove the backing plate.
8) Put a piece of tape on the ribbon cable to prevent it from retracting into the plotter. **Important** - Do not let the ribbon cable slip back into the housing.
9) Disengage the cable connector on the carriage and remove the ribbon cable from the carriage.
10) Pull the top of the carriage from the upper traverse rod and then pull the bottom of the carriage away from the lower traverse rod.
11) Unscrew the carriage belt retaining screw on the back of the carriage.
12) To prevent damage to the tool carriage, carefully set the top tool carriage wheels onto the upper traverse rod, then gently snap the lower tool carriage wheels onto the lower traverse rod and slide the tool carriage all the way to the left, against the left end plate.
13) Unscrew and remove the three screws that hold the right end cap to the Studio7 and remove the right end cap.
14) Remove all the bottom pan screws, and remove the bottom pan.
15) Remove the four screws and washers that hold the Y-Axis transmission assembly to the right end plate of the Studio7.
16) Pull out the Y-Axis transmission assembly.
17) Disconnect the power cables (the black and white twisted pair)
18) Carefully check the route of the gray encoder cable from the Y-Axis transmission assembly to the connector on the main logic board.
19) Cut all the cable ties and discard them.
20) Disconnect the gray encoder cable from the connector on the main logic board.
21) Connect the DC power cables (the black and white twisted pair) to the new Y-Axis transmission assembly. Plug the white cable onto the post labeled + and the black cable to the post labeled -. **Important** - These connections must not be reversed, or damage to the plotter could result.

22)Hold the new Y-Axis transmission assembly against the right end plate of the Studio7.
23)Use the four screws and the washers to attach the new Y-Axis transmission assembly to the right end plate of the Studio7.
24)Route the gray encoder cable from the new Y-Axis transmission assembly to the connector on the main logic board and plug it in.
25)Use cable ties to secure the gray encoder cable and the DC motor power cables.
26)Pull the two ends of the tool carriage belt together to make sure that the belt hasn't snagged or twisted. Make sure the belt teeth are facing the inside of the Studio7.
27)Make sure all cables and wiring are secured and re-install the bottom pan on the Studio7.
28)Pull the top of the tool cartridge off the upper traverse rod and then pull the bottom of the tool carriage away from the lower traverse rod.
30)Use the tool carriage belt retaining screw to attach the ends of the tool carriage belt to the back of the tool carriage assembly.
31)Carefully set the top tool carriage wheels on the upper traverse rod, then gently snap the lower tool carriage wheels onto the lower traverse rod.
32)Gently pull on the tool carriage belt (flex it away from the Studio7). Then slide the backing plate under the belt and attach it to the new tool carriage assembly. Make sure the belt is on the outside of the backing plate.
33)Use needle nose pliers to reattach the four e-clips.
34)Make sure the tool carriage belt tensioner bracket is securely seated to the left end plate of the Studio7 and then use a 9/64" hex wrench to tighten the tool carriage belt tension screw.
35)Gently slide the tool carriage to either the far right or the far left position of the traverse assembly, as far as it will go.
36)Gently pull on the middle of the tool carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.
37)Re-install the left and right end caps, lower the dust cover, and reconnect the power cable and interface cables.

Y-Axis Transmission Assembly



Y-AXIS BELT REPLACEMENT

Follow this procedure to replace the Y-Axis belt.

1) Turn off the Studio7 and disconnect the power cord.
2) Disconnect any interface cables.
3) Lift up the dust cover.
4) Unscrew the three screws on the left end cap on the Studio7 and remove it.
5) Using the 9/66" hex wrench, loosen the tool carriage belt tensioner.
6) Use a small flat head screwdriver to remove the four e-clips on the backing plate on the tool carriage.
7) Remove the backing plate.
8) Put a piece of tape on the ribbon cable to prevent it from retracting into the plotter.
9) Disengage the cable connector on the carriage and remove the ribbon cable from the carriage.
10) Pull the top of the carriage from the upper traverse rod and then pull the bottom of the carriage away from the lower traverse rod.
11) Unscrew the carriage belt retaining screw on the back of the carriage.
12) To prevent damage to the tool carriage, carefully set the top tool carriage wheels onto the upper traverse rod, then gently snap the lower tool carriage wheels onto the lower traverse rod and slide the tool carriage all the way to the left, against the left end plate.
13) Unscrew and remove the three screws that hold the right end cap to the Studio7 and remove the right end cap.
14) Remove all the bottom pan screws, and remove the bottom pan.
15) The Y-Axis belt loops around an idler pulley and a drive gear in the Y-Axis transmission assembly. Pull the Y-Axis belt through the right end plate to disengage it, and then pull it away from the Studio7.
16) Pull one end of the new Y-Axis belt through the left end Y-Axis belt tensioner.
17) Pull the two ends of the tool carriage belt together to make sure that the belt hasn't snagged or twisted. Make sure the belt teeth are facing the inside of the Studio7.
18) Make sure all cables and wiring are out of the way, and reinstall the bottom pan on the Studio7.
19) Re-install the bottom pan screws.
20) Pull the top of the tool carriage of the upper traverse rod and then pull the bottom of the tool carriage away from the lower traverse rod.
21) Use the tool carriage belt retaining screw to attach the ends of the tool carriage belt to the back of the tool carriage assembly.
22) Carefully set the top tool carriage wheels on the upper traverse rod, then gently snap the lower tool carriage wheels onto the lower traverse rod.

23)Gently pull on the tool carriage belt (flex it away from the Studio7). Then slide the backing plate under the belt and attach it to the new tool carriage assembly. Make sure the belt is on the outside of the backing plate.
24)Use needle nose pliers to re-attach the four e-clips
25)Make sure the tool carriage belt tensioner bracket is securely seated to the left end plate of the Studio7 and then use a 9/64" hex wrench to tighten the tool carriage belt tension screw.
26)Gently slide the tool carriage to either the far right or to the far left position of the traverse assembly, as far as it will go.
27)Gently pull on the middle of the tool carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.
28)Re-install the left and right end caps, lower the dust cover, and reconnect the power cable and interface cables.

GEAR LASH ADJUSTMENT FOR BOTH Y AND X AXIS

If the axis are moving but you seem to have registration loss or hear a clicking in the transmissions, take the right end cap off the Studio7, and check the amount of gap between the pinion gear on each motor and the spur gear on each transmission. There should not be a gap, if there is, adjust motor position to close the gap and make the smaller gear flush with the large gear.

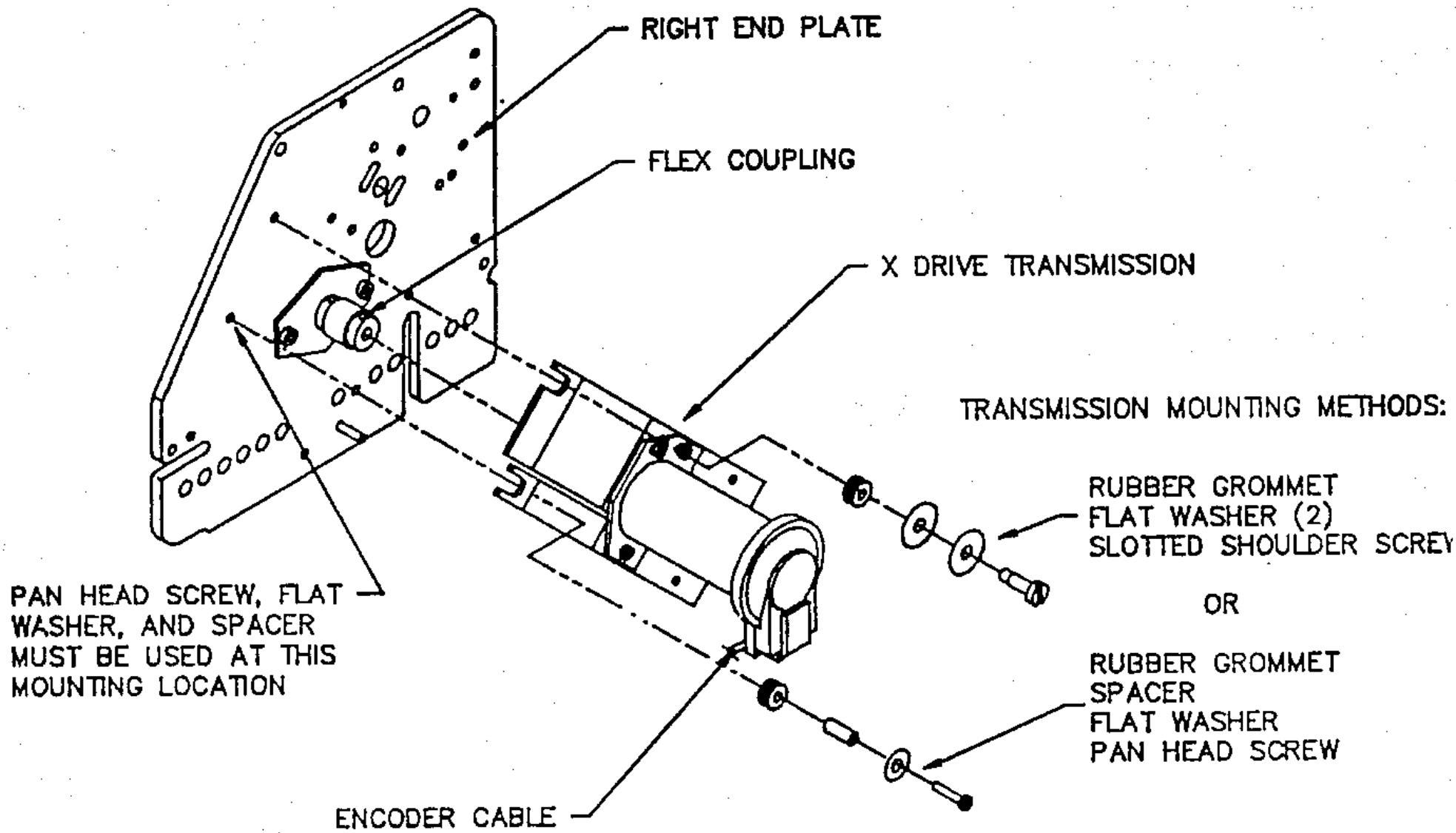
X-AXIS SUBSYSTEM

The X-Axis subsystem is the part of the Studio7 that moves the media forward and back through the machine. There are two replacement procedures for this subsystem: transmission assembly replacement and grit shaft replacement.

X-Axis Transmission Assembly Replacement
>>>>>Note: Electro-static discharge preventative measures must be adhered to during all assembly replacement procedures.

1)Turn off the Studio7 and disconnect the power cord.
2)Disconnect any interface cables.
3)Lift up the dust cover.
4)Unscrew the three screws on the left end cap on the Studio7 and remove it.
5)Using the 9/66" hex wrench, loosen the tool carriage belt tensioner.

X-Axis Transmission Assembly



6) Use a small flat head screwdriver to remove the four e-clips on the backing plate on the tool carriage.
7) Remove the backing plate.
8) Put a piece of tape on the ribbon cable to prevent it from retracting into the plotter.
9) Disengage the cable connector on the carriage and remove the ribbon cable from the carriage.
10) Pull the top of the carriage from the upper traverse rod and then pull the bottom of the carriage away from the lower traverse rod.
11) Unscrew the carriage belt retaining screw on the back of the carriage.
12) To prevent damage to the tool carriage, carefully set the top tool carriage wheels onto the upper traverse rod, then gently snap the lower tool carriage wheels onto the lower traverse rod and slide the tool carriage all the way to the left, against the left end plate.
13) Unscrew and remove the three screws that hold the right end cap to the Studio7 and remove the right end cap.
14) Remove all the bottom pan screws, and remove the bottom pan.
15) Remove the four screws and washers that hold the Y-Axis transmission assembly to the right end plate of the Studio7.
16) Pull out the Y-Axis transmission assembly.
17) Remove the four screws and washers that hold the X-Axis transmission assembly to the right end plate of the Studio7.
18) On the right side of the Studio7, between the X-Axis transmission assembly and the end of the grit shaft, you will find a flex coupling. This flex coupling has a set screw on one end. Use a 5/64" hex wrench to loosen both of these screws.
19) Pull out the X-Axis transmission assembly.
20) Disconnect the power cables (the black and white twisted pair).
21) Carefully check the route of the gray encoder cable from the X-Axis transmission assembly to the connector on the main logic board.
22) Cut all the cables ties and discard them.
23) Disconnect the gray encoder cable from the connector on the main logic board.
24) Connect the DC power cables (black and white twisted pair) to the new X-Axis transmission assembly. Plug the white cable onto the post labeled + and the black cable to the post labeled -.
25) Hold the new X-Axis transmission assembly against the right end plate of the Studio7.
26) Use the four screws and washers to attach the X-Axis assembly to the right end plate of the Studio7.
27) Route the gray encoder cable from the new X-Axis transmission assembly to the connector on the main logic board, and plug it in.
28) Locate the flats on the new transmission output shaft and the flat on the grit shaft pin. Tighten the set screws down on these flats until they are snug, then 1.4 turn beyond (Careful! Do not strip the set screw).

29) Use cables ties to secure the gray encoder cable, the DC motor power cable.
30) Use the four screws and washers to re-install the Y-Axis transmission assembly to the right end plate of the Studio7.
31) Pull the two ends of the tool carriage belt together to make sure that the belt is not snagged or twisted. Make sure the belt teeth are facing the inside of the Studio7.
32) Making sure all cables and wiring are secure, re-install the bottom of the pan on the Studio7.
33) Re-install the bottom pan screws.
34) Pull the top of the tool carriage off the upper traverse rod and then pull the bottom of the tool carriage away from the lower traverse rod.
35) Use the tool carriage belt retaining screw to attach the ends of the tool carriage belt to the back of the tool carriage assembly.
36) Carefully set the top tool carriage wheels onto the upper traverse rod, then gently snap the lower tool carriage wheel onto the lower traverse rod.
37) Gently pull on the tool carriage belt (flex it away from the Studio7). Then slide the backing plate under the belt and attach it to the new tool carriage assembly. Make sure the belt is on the outside of the backing plate.
38) Use needle nose pliers to re-attach the four e-clips.
39) Make sure the tool carriage belt tensioner bracket is securely seated to the left end plate of the Studio7 and then use a 9/64" hex wrench to tighten the tool carriage belt tension screw.
40) Gently slide the tool carriage to either the far right or the far left position of the traverse assembly, as far as it will go.
41) Gently pull on the middle of the tool carriage belt. Exert 300 to 420 grams (10.5 to 14.8 ounces) of pressure to the belt. The belt should deflect about 1/2 inch. Adjust the belt tension screw until you achieve 1/2 inch belt deflection.
42) Re-install the left and right end caps, lower the dust cover, and reconnect the power cable and interface cable.

GRIT SHAFT REPLACEMENT

Follow this procedure to replace the grit shaft.
Note: Electro-static discharge preventative measures must be adhered to during all assembly replacement procedures.

1) Turn off the Studio7 and disconnect the power cord and any interface cables.
2) Move the lever on the left side of the plotter to the up position (this takes all pressure of the chart wheels).

3) Remove all the bottom pan screws and remove the bottom pan.
4) Unscrew the three screws that hold the right and left end caps on the Studio7.
5) On the right side of the Studio7, between the X-Axis transmission assembly and the end of the grit shaft, you will find a flex coupling. This flex coupling has a set screw on one end. Use a 5/64" hex wrench to loosen both set screws.

>>>>>**Note:** You have to use a pair of pliers to hold the hex wrench in order to reach the flex coupling set screws.
6) Unscrew and remove the four screws and washers that hold the X-Axis transmission assembly to the right end plate.
7) Unscrew and remove the two square drive screws that hold the grit shaft bearing retainer plate to the right end plate.
8) Remove the grit shaft retainer plate.
9) Remove the four 4-40 mounting screws on the megabuffer board installed on the main logic board.
10) Gently pull the megabuffer board 64-pin receptacle away from the logic board 64-pin connector.
11) Remove the megabuffer board. Set it aside on a static free, clean surface.

>>>>>**Note:** Mark the locations of all the main logic board connectors before you disconnect any of them. This will make it easier to correctly re-install the connectors after you re-install the logic board.
12) Mark and disconnect the eight cable connectors that are plugged into the main logic board.
13) Unscrew and remove the six screws holding the logic board to the mounting plate.
14) Remove the main logic board. Set it aside on a clean, static free surface.
15) Unscrew and remove the four screws and star washers that hold the logic board mounting plate to the frame of the Studio7.
16) Remove the mounting plate.
17) Unscrew the two Phillips head screws that hold the cooling fan (36" model only to the Studio7 frame). Also remove the two star washers and spacers. Remove the fan (36" model only).
19) Remove the two Phillips head screws that hold the mid-shaft bearing block on the grit shaft to the frame of the Studio7.
20) Place the head of a screwdriver against the grit shaft axle pin. The grit shaft axle pin is seated in a bearing on the left end of the Studio7.
21) Gently but firmly tap the butt of the screwdriver (with the head of a screwdriver against the grit shaft axle pin) until the axle pin clears the bearing.
22) At this point, the right end of the grit shaft should be pushing through the right end plate of the Studio7. Remove the bearing, bearing sleeve, and spacer from the right end of the grit shaft.

23) Gently slide the left end of the grit shaft to the right until the left end of the grit shaft clears the power supply of the Studio7.
24) Slide the left end of the grit shaft out through the underside of the Studio7.
25) Remove the grit shaft. Before you install the new grit shaft, check the orientation of the shaft and **make sure** the grit shaft axle pin will be seated in the left end plate of the Studio7.
27) Slide the right end of the new grit shaft through the underside of the Studio7. Continue to slide it through the grit shaft slot in the right end plate until the left end clears the power supply.
28) Install the bearing, bearing sleeve on the right end of the new grit shaft (new grit shafts do not use the spacer. Mid block bearings and the coupling pins are glued in, this eliminates the need for spacers).
29) Slide the left end of the new grit shaft into the bearing in the left end plate of the Studio7.
30) Re-install the two Phillips head screws into the mid-shaft bearing block on the frame of the Studio7.
31) Re-install the cooling fan into the Studio7 frame (36" model only).
32) Re-install the logic board mounting plate to the frame of the Studio 7.
33) Re-install the main logic board.
34) Reconnect the eight cable connections to the main logic board.
35) Re-install the megabuffer board on the main logic.
36) Re-install the grit shaft bearing retainer plate in the right end plate of the Studio7.
37) Re-install the flex coupling into the grit shaft bearing retainer plate, but do not tighten it.
38) Re-install the X-Axis transmission assembly to the right end plate of the Studio7.
39) Tighten both sets screws on the flex coupling to the faults of both pins.
40) Making sure all cables and wires are out of the way, re-install the bottom pan.
41) Re-install all screws into the bottom pan of the Studio7.
42) Re-install the right and left end caps and reconnect the power cord and the interface cables.

CHART TAPE REPLACEMENT

Follow this procedure to replace the chart tape.

1) Turn off the Studio7 and disconnect the power cord.
2) Use an exacto knife to pull up one corner of the old chart tape.
3) Firmly grip the pulled up corner and then remove the old chart tape by peeling it out of the molded groove on the front platen of the Studio7.
4) Pull a strip of new chart tape off the roll. Make sure that this new strip of tape is slightly longer than the length of the platen.
5) Carefully press the new tape, chart tape, into the molded groove, behind the airholes in the platen. Make sure you don't cover the air holes.
6) Trim excess tape from the end of the platen.
7) Reconnect the power cord and then the interface cable to the Studio7.

ELECTRICAL SUBSYSTEM

The electrical subsystem provides power to other subsystems. There is one assembly replacement procedure for this subsystem: Power supply replacement. Refer to the power supply test to help you determine whether the power supply has failed.

POWER SUPPLY TEST

Follow this procedure to test the power supply.

1) Remove the bottom pan screws from the bottom pan. Remove the bottom pan.
2) Plug the power cord into the Studio7. Turn it on.
3) Visually inspect the Studio7 power supply for burn marks and sniff the air near the power supply. If you see any burn marks or notice an acrid odor, this may mean that the power supply has burned out and must be replaced. If everything seems to be normal, continue with the power supply test.
4) Turn on the voltmeter and use the test probes to check for the following voltage settings. If any of the settings exceed 5% variance, replace the power supply.

>>>>>**Note:** The power supply connector colors refer to the color of the wire that runs into each power supply connector.

* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the yellow power supply connector. The voltmeter reading should be +33 volts +/-5%.

* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the white power supply connector. The voltmeter reading should be **+14 volts +/-5%.**
* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the green power supply connector. The voltmeter reading should be **+12 volts +/-5%.**
* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the blue power supply connector. The voltmeter reading should be **+12 volts +/-5%.**
* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the black power supply connector. The voltmeter reading should be **+5volts +/-5%.**
* Insert the black (negative) test probe in the black power supply connector (j-3) and red (positive) test probe in the red power supply connector. The voltmeter reading should be **+5 volts +/-5%.**
*Insert the black (negative) test probe in the black power supply connector (j-5) and red (positive) test probe in the black power supply connector. The voltmeter reading should be **+20 volts +/-5%.**

POWER SUPPLY REPLACEMENT

Follow this procedure to replace the power supply.

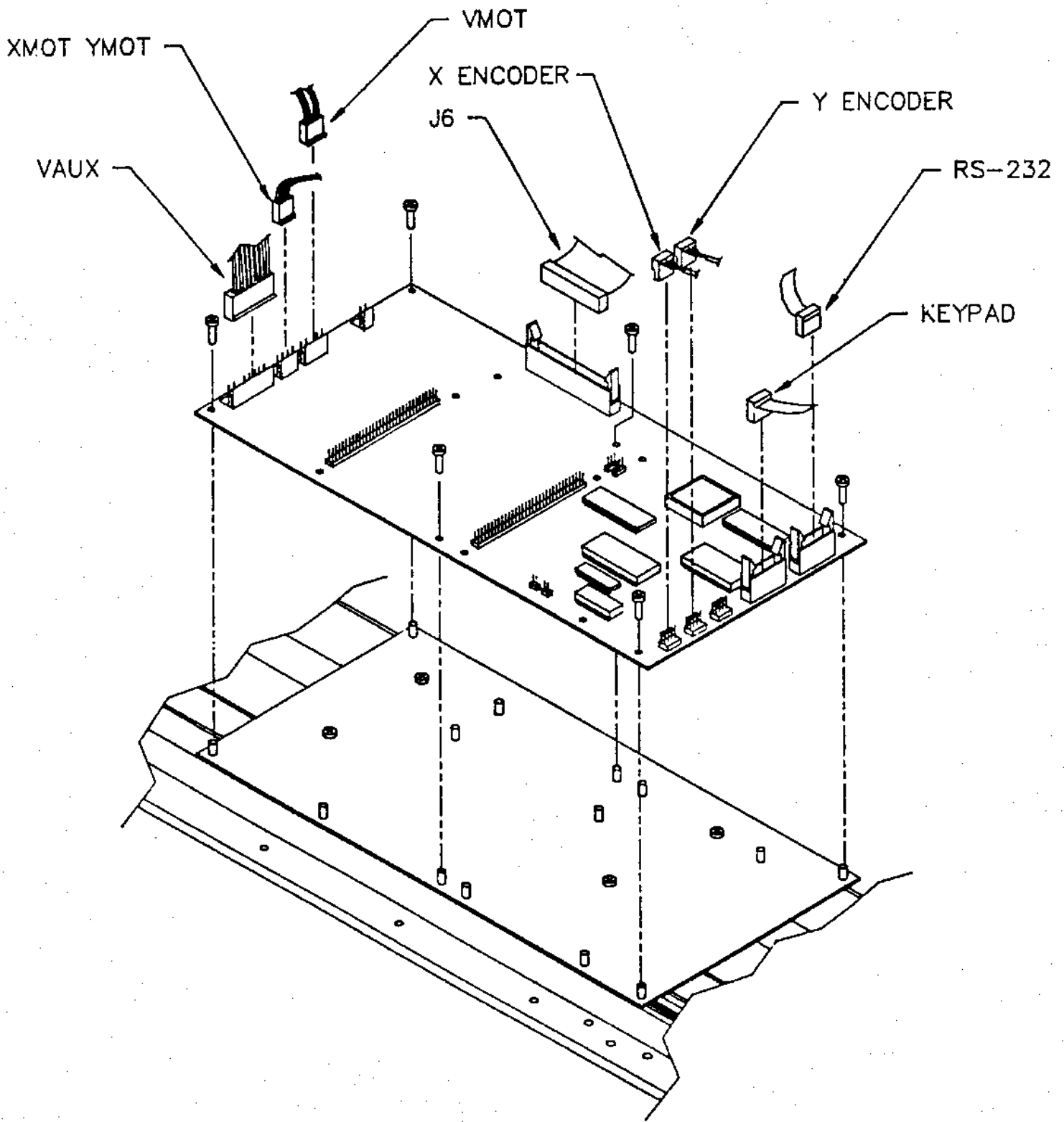
>>>>>**Note:** Electro-static discharge preventative measures should be adhered to during all assembly replacement procedures.

1)Turn off the Studio7, disconnect the power cord.
2)Disconnect the interface cable.
3)Remove the bottom pan screws, and remove bottom pan.
4)Remove the AC -to- Power supply cable.
5)Remove the AC -to- transformer connector.
6)Cut the cable ties.
7)Remove the power supply to main logic board connector.
8)Remove the red and black, twin wire, rectifier -to- main logic board connector (note connections at the rectifier).
9)Remove the four button head screws to attach the power supply to the frame of the Studio7.
10)Install the new power supply assembly into the Studio7.
11)Use the four button head screws to attach the power supply to the frame of the Studio7.
12)Reconnect the red and black, twin wire, rectifier -to- main logic board connector. Observe polarity.
13)Re-install power supply -to- main logic board connector.
14)Re-install the AC -to- transformer connector.
15)Reconnect the AC -to- Power supply cable.
16)Install new cable ties.
17)Make sure all wires and cables are out of the way, then re-install the bottom pan.
18)Re-install all screws into the bottom pan of the Studio7.
19)Reconnect the power cord and the interface cables.

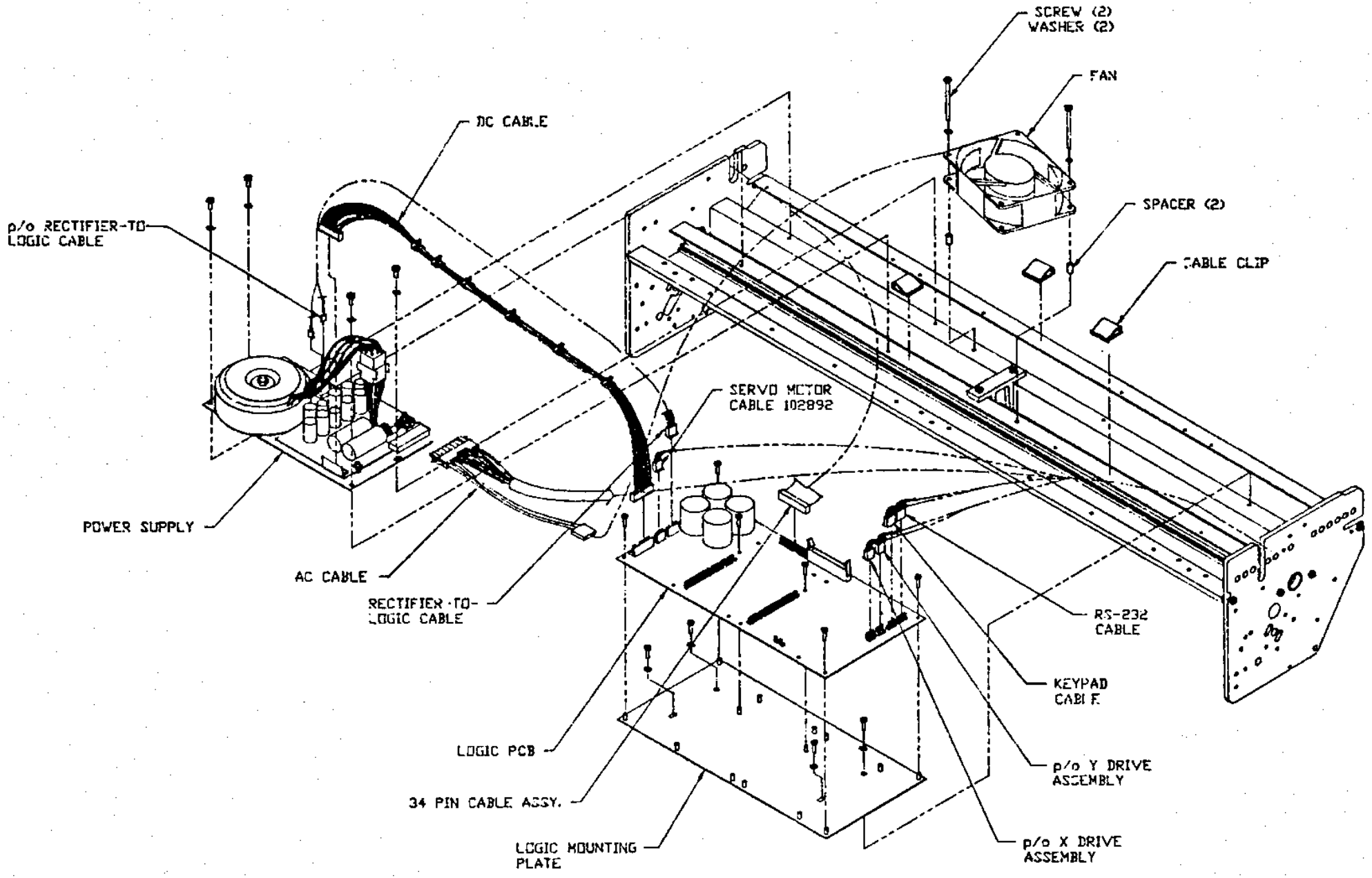
ELECTRONIC SUBSYSTEM

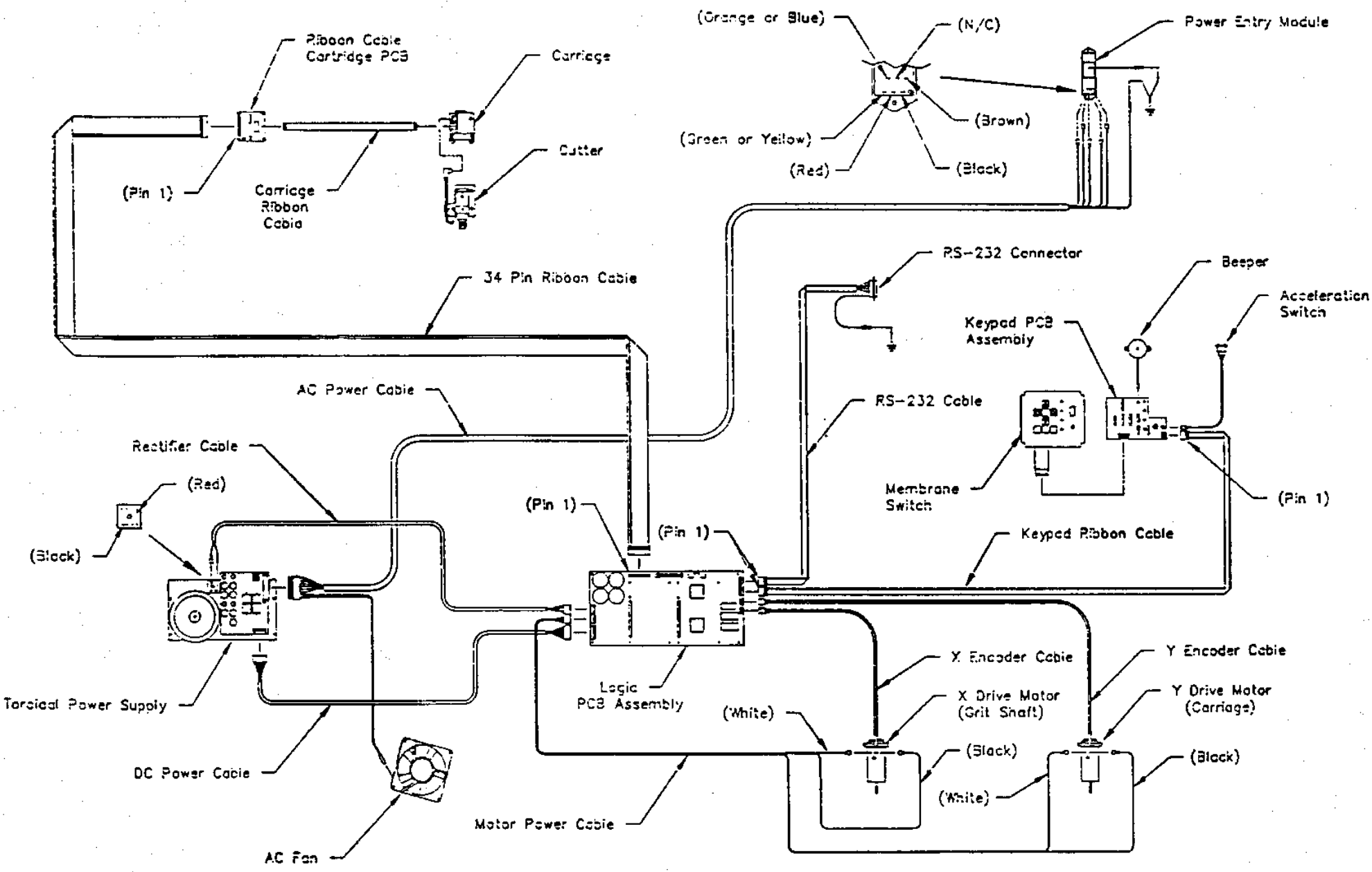
The electronic subsystem controls the other Studio7 subsystems. There are two assembly replacement procedures for this subsystem: main logic board replacement and keypad replacement.

Main Logic Board Connectors

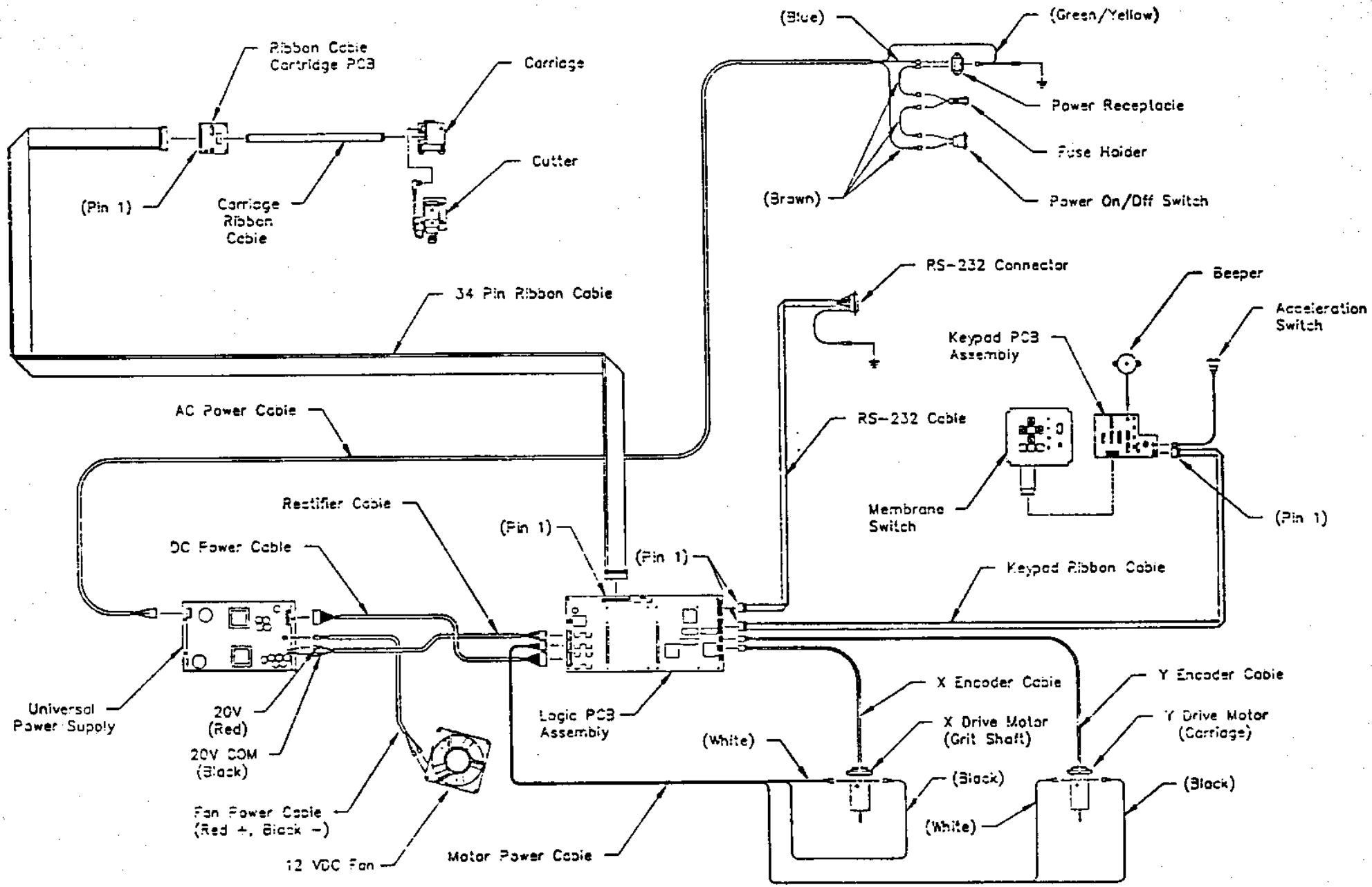


Exploded view





Studio 7 Cabling Diagram
Toroidal Power Supply



Studio 7 Cabling Diagram
Universal Power Supply

MAIN LOGIC BOARD REPLACEMENT

Follow this procedure to replace the main logic board.

>>>>>**Note:** Electro-static discharge preventative measures must be adhered to during all assembly replacement procedures

>>>>>**Note:** Mark all the locations of the main logic board connectors before you disconnect any of them. This will make it easier to correctly re-install the connectors after you re-install the logic board.

1) Turn off the Studio7 and remove the bottom pan.
2) Disconnect any interface cables.
3) Remove all bottom pan screws, and remove the bottom pan.
4) Remove the four 4-40 screws that fasten the megabuffer board to the main logic board.
5) Gently pull the megabuffer board 64-pin receptacle away from the main logic board 64-pin connector.
6) Remove the megabuffer board, use an anti-static bag, and place it on a clean, static free surface.
7) Mark and disconnect the eight cable connectors that are plugged into the main logic board.
8) Remove the six screws that secure the logic board to the mounting plate.
9) Remove the main logic board. Place the board inside an anti-static bag and set it aside on a clean, static free surface.
10) Install the new main logic board to mounting plate.
11) Connect the eight cable connectors to the new main logic board.
12) Re install the megabuffer board.
13) Install new cable ties.
14) Make sure all wires and cables are out of the way, then re-install the bottom pan.
15) Re-install all screws into the bottom pan of the Studio7.
16) Reconnect the power cord and the interface cables.

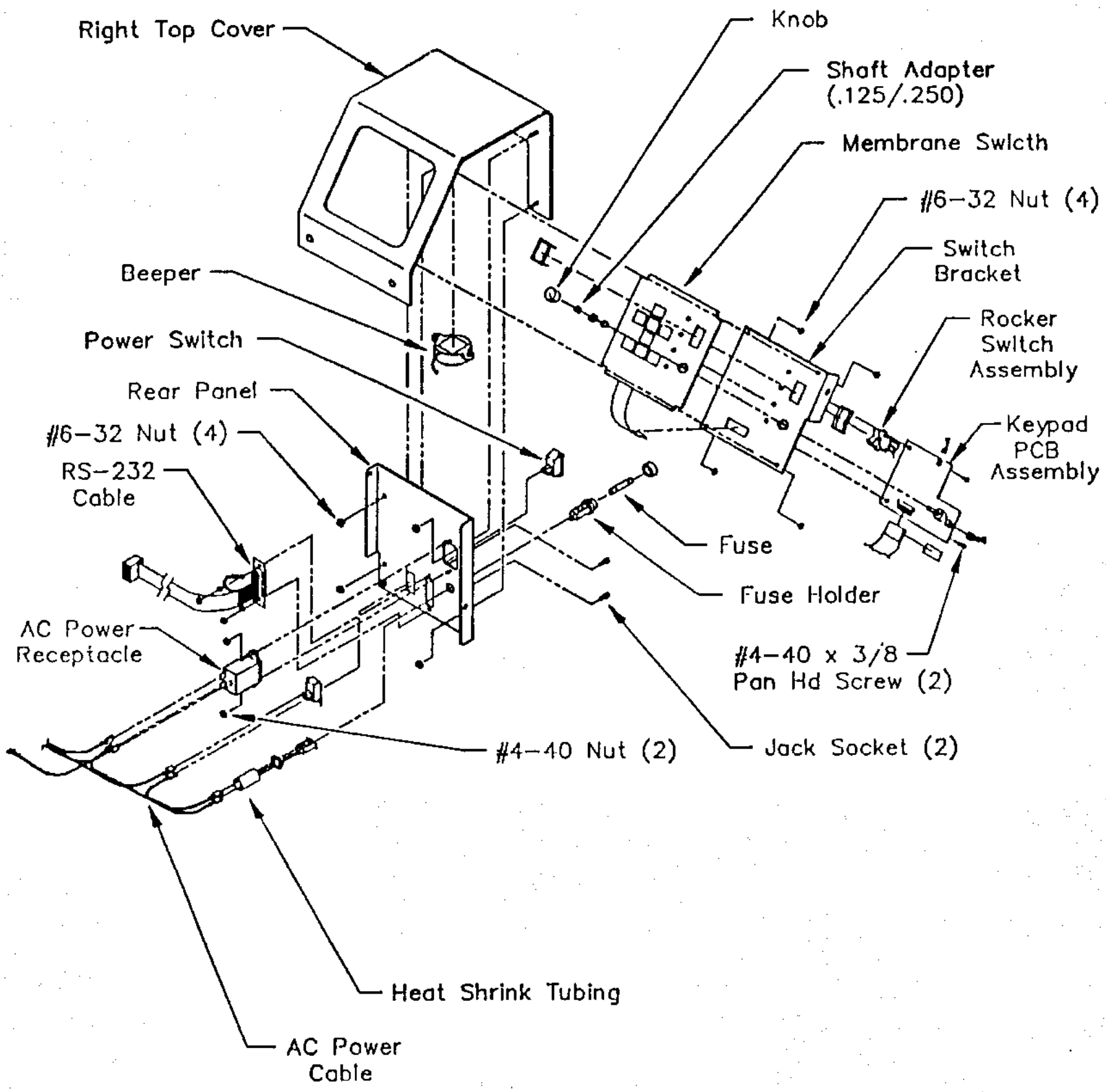
KEYBOARD REPLACEMENT

Follow this procedure to replace the keypad assembly.

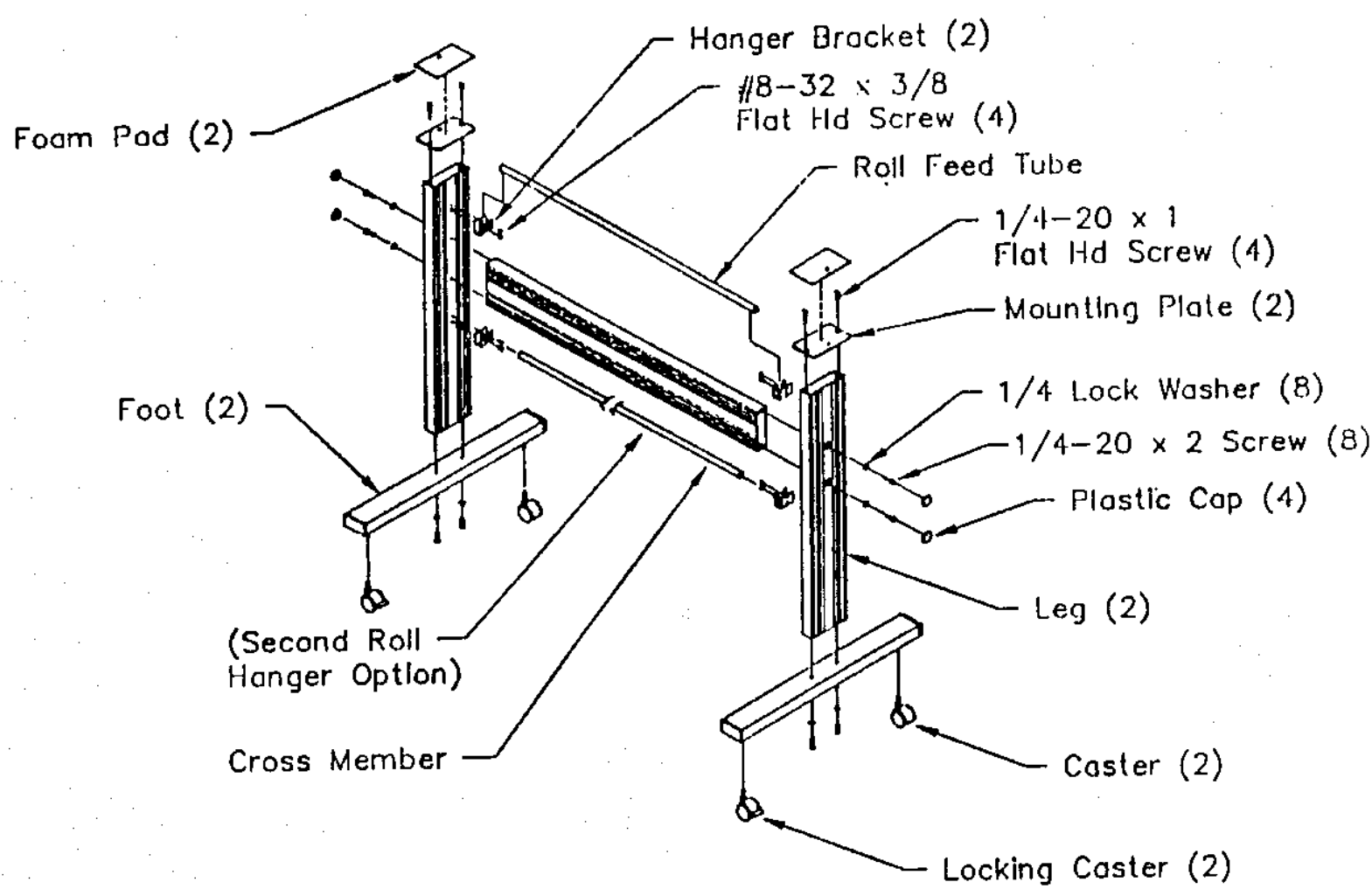
>>>>>**Note:** Electro-static discharge preventative measures must be adhered to during all assembly replacement procedures.

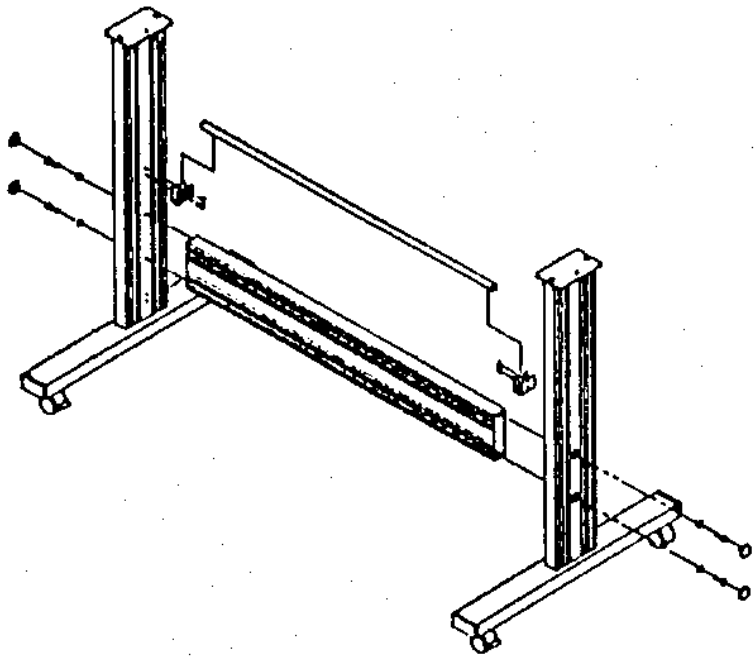
1) Turn off the Studio7 and disconnect the power cord.
2) Disconnect the interface cable.
3) Remove the bottom pan screws, and remove the bottom pan.
4) Cut the table ties from the serial cable that runs from the j-8 position on the main logic board to the keypad assembly.
5) Remove the serial cable (rainbow ribbon cable) from the j-8 position on the main mother board.

6) Remove the nut and lock washer that connects the two green ground wires to the rear panel of the Studio7.
7) Remove the 4 screws holding the right top cover assembly to the chassis of the Studio7.
8) Remove the gray ribbon cable form the keypad.
9) Gently lift the right top cover assembly from the Studio7, being careful not to snag any cables or wires.
10) Set the right top cover assembly upside down on a clean and static free surface.
11) Remove the six #6-32 nuts holding the keypad assembly to the right top cover.
12) Remove the old keypad.
13) Install new keypad and nuts.
14) Re-install right top cover to chassis of the Studio7.
15) Re-install all cables and wires to their previous locations.
16) Make sure all wires and cables are out of the way, then re-install the bottom pan.
17) Re-install all screws into the bottom pan of the Studio7.
18) Reconnect the power cord and the interface cables.



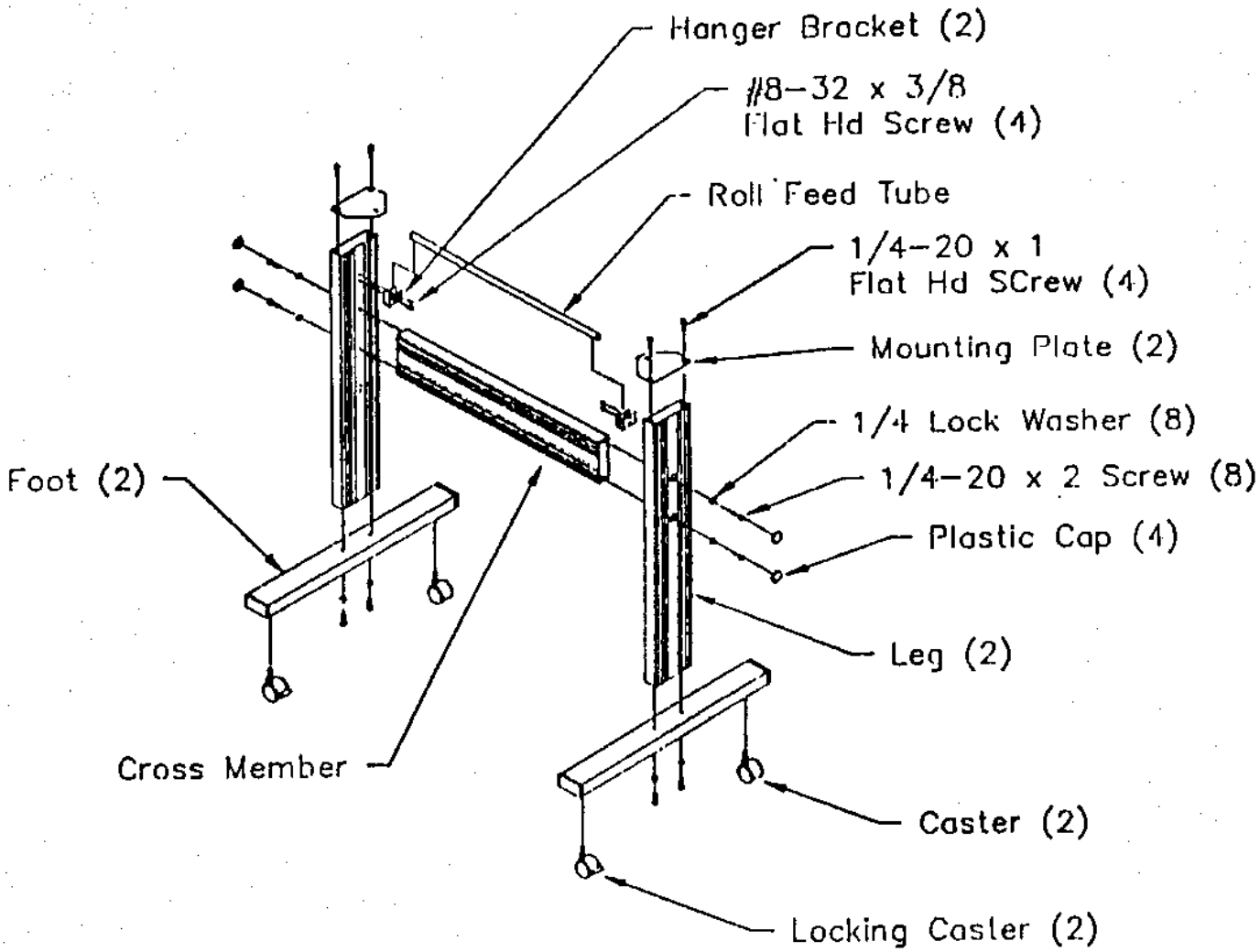
Studio 7 Right Cover Assembly

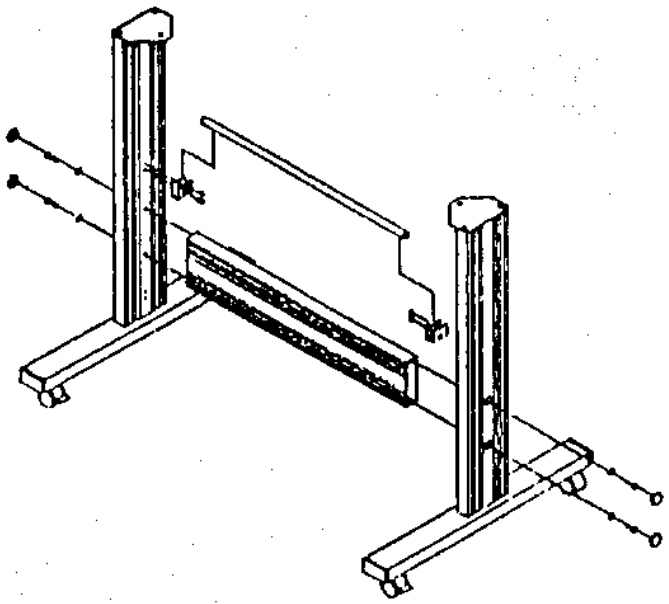




Alternate
Assembly
Method

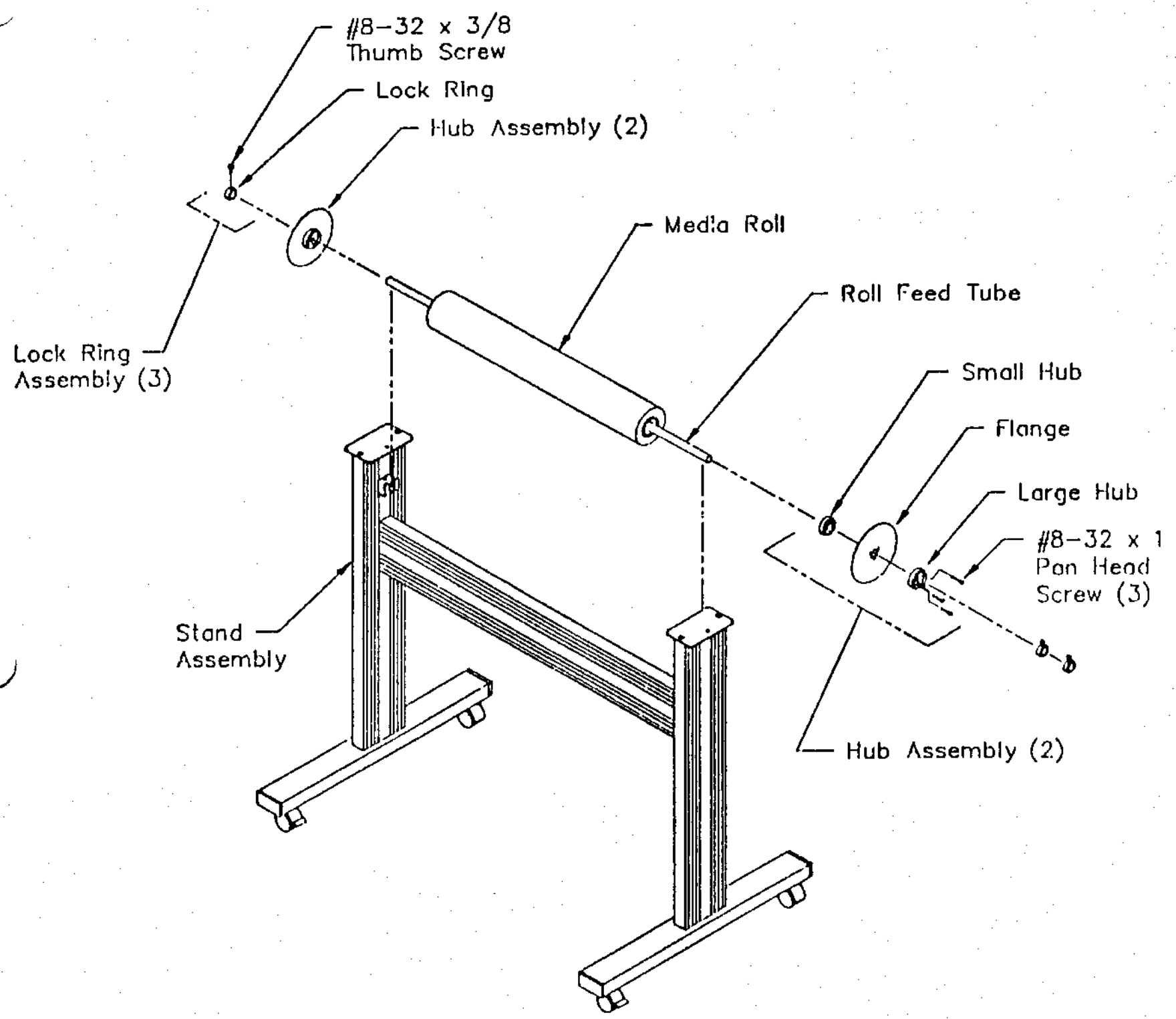
36 Inch Stands



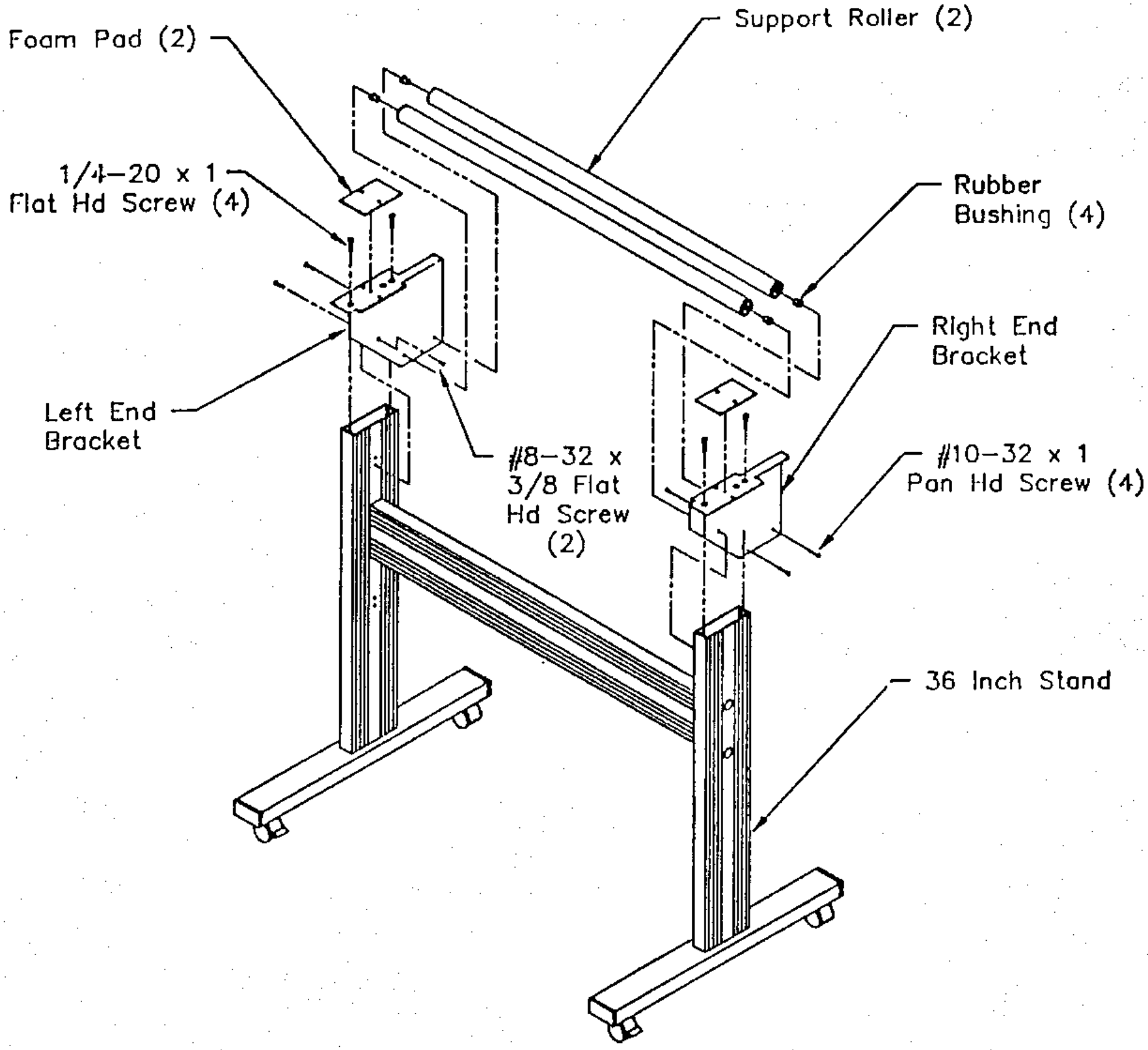


Alternate
Assembly
Method

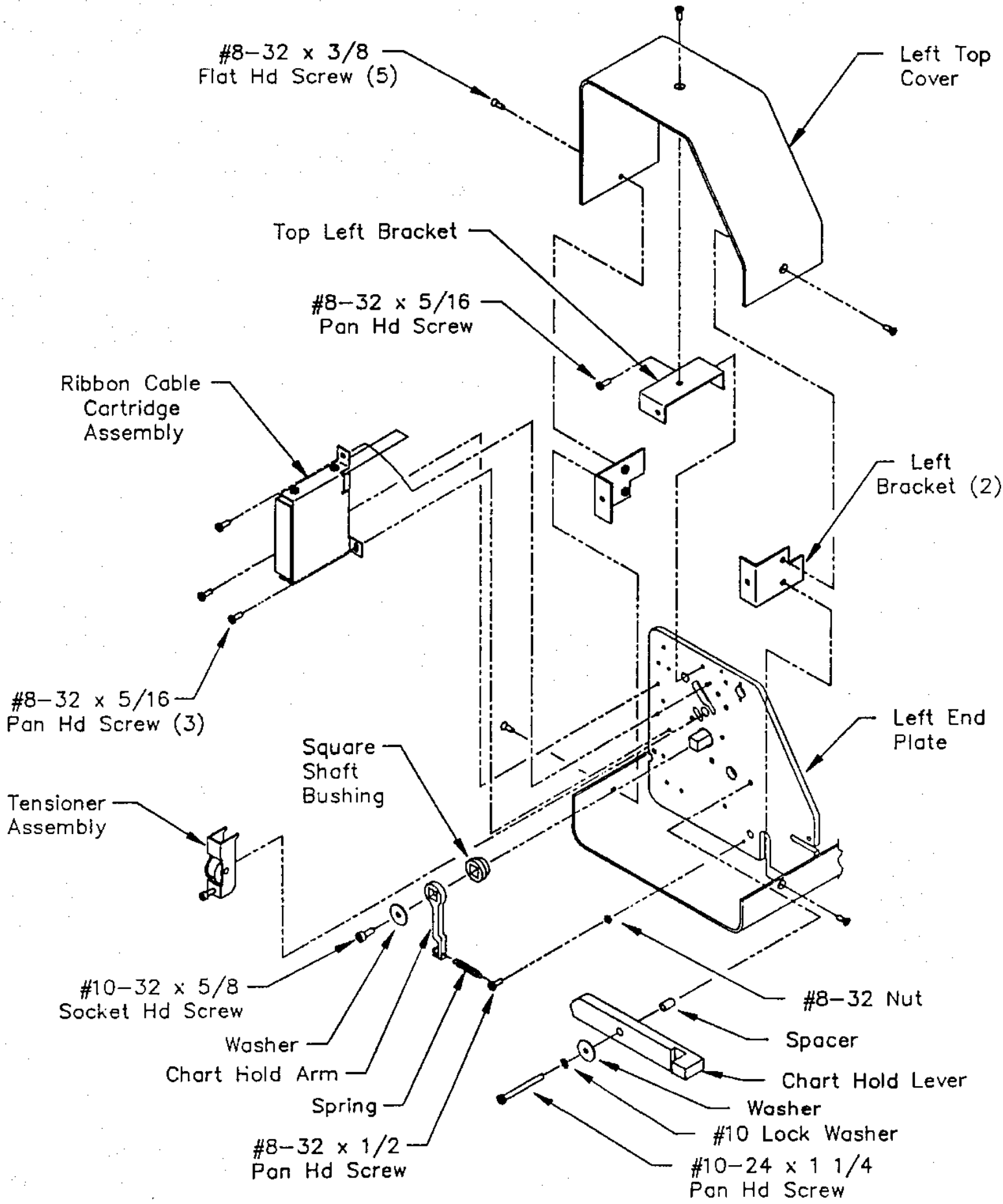
24 Inch Stand Assemblies



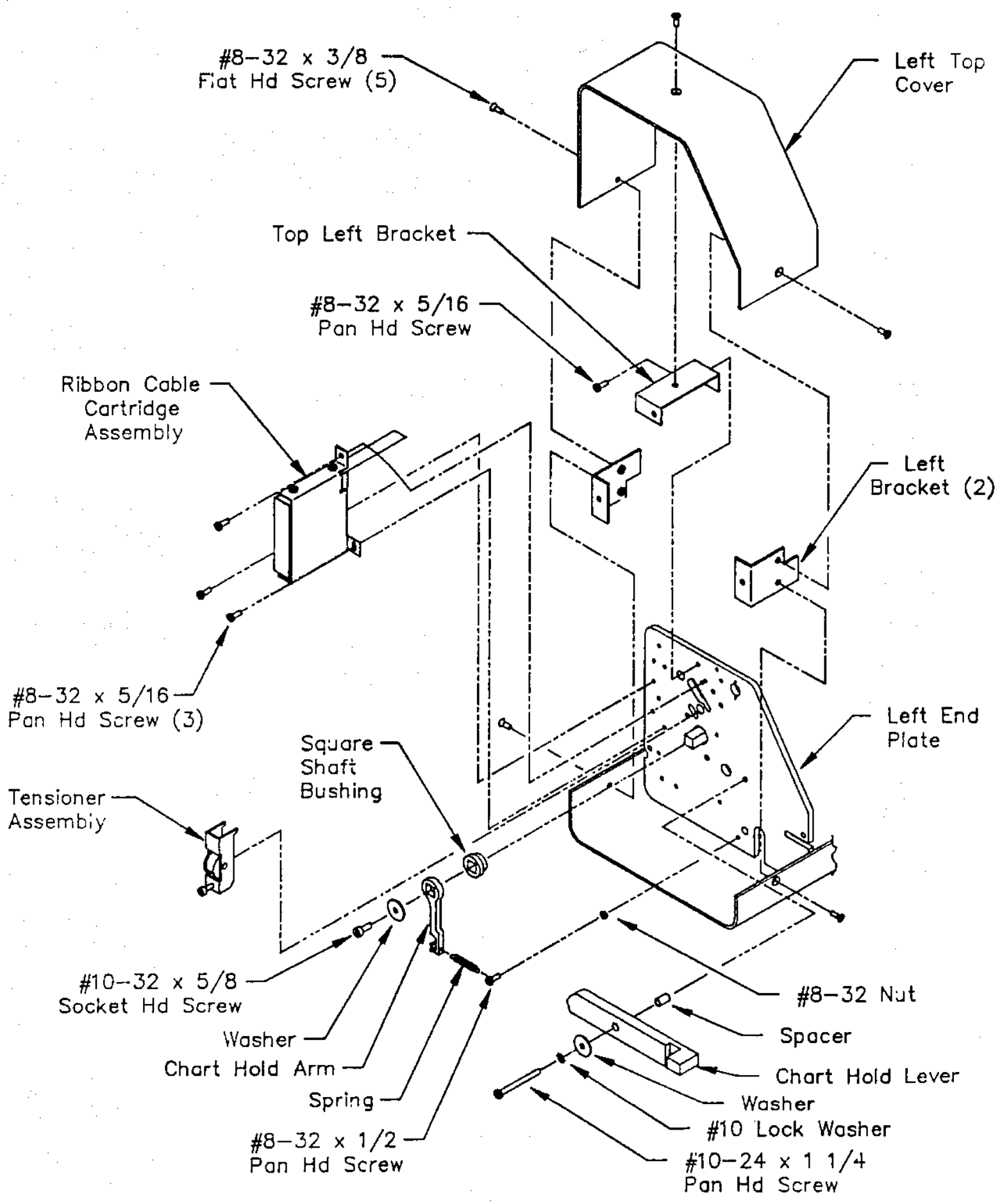
Passive Roll Feed Parts



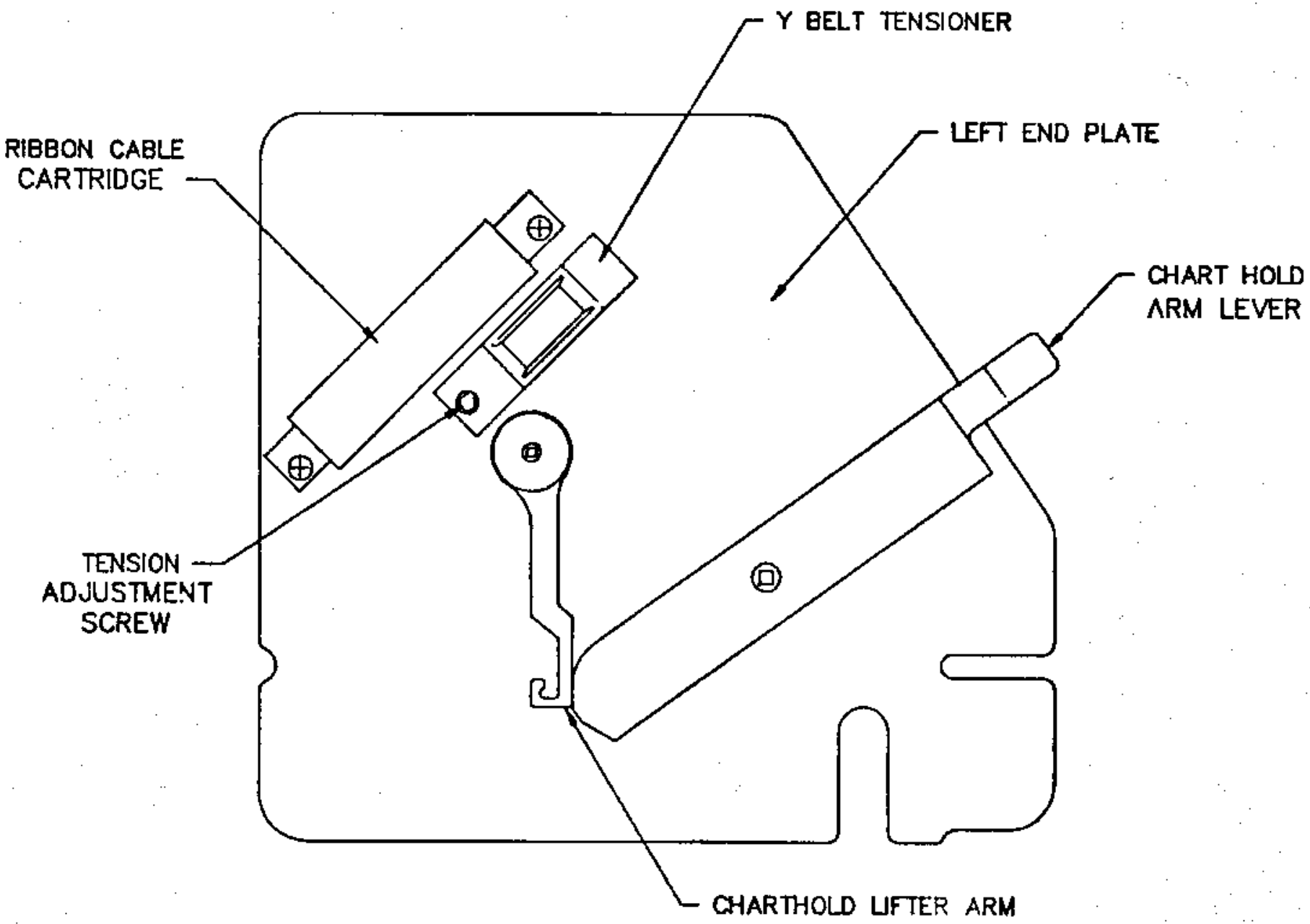
Media Support Roller Option

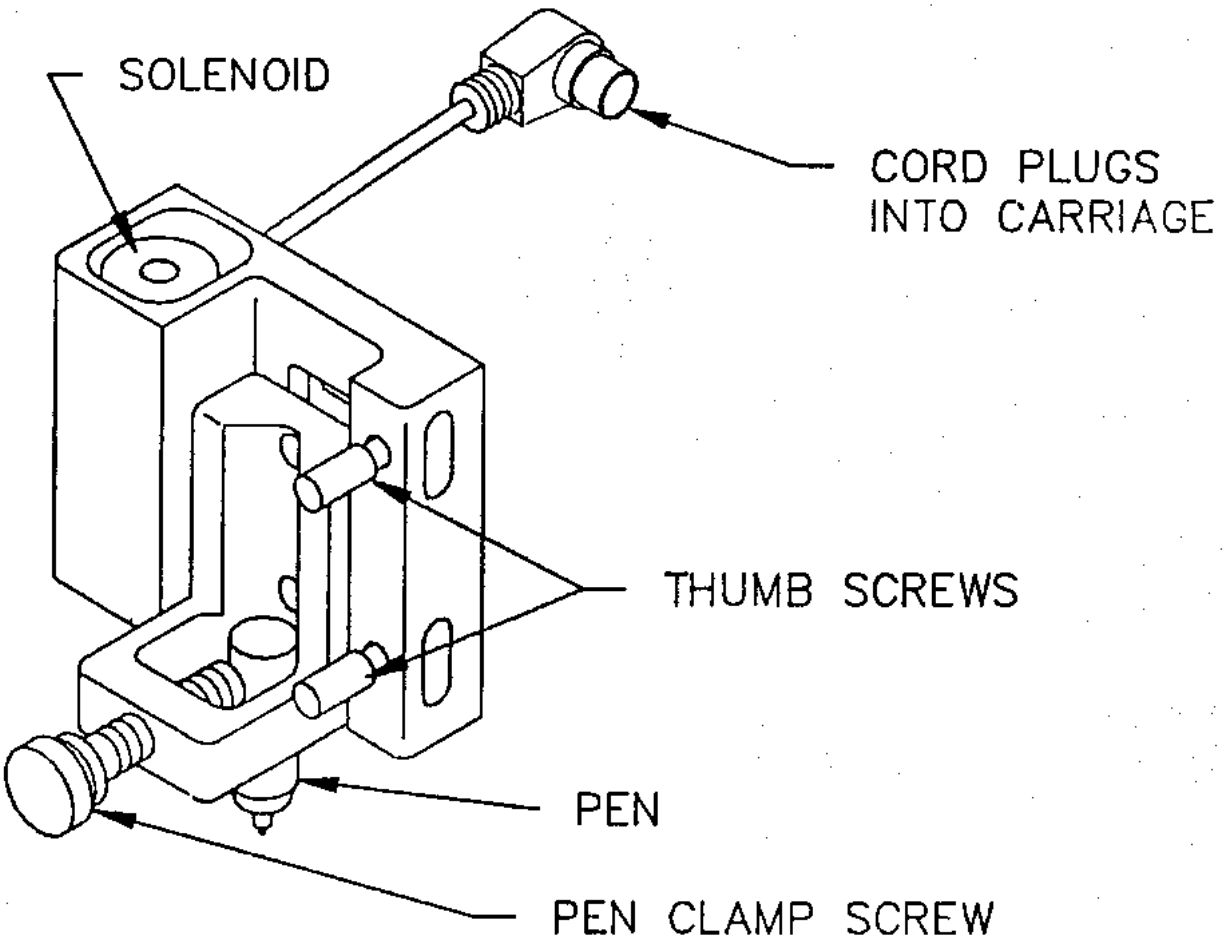


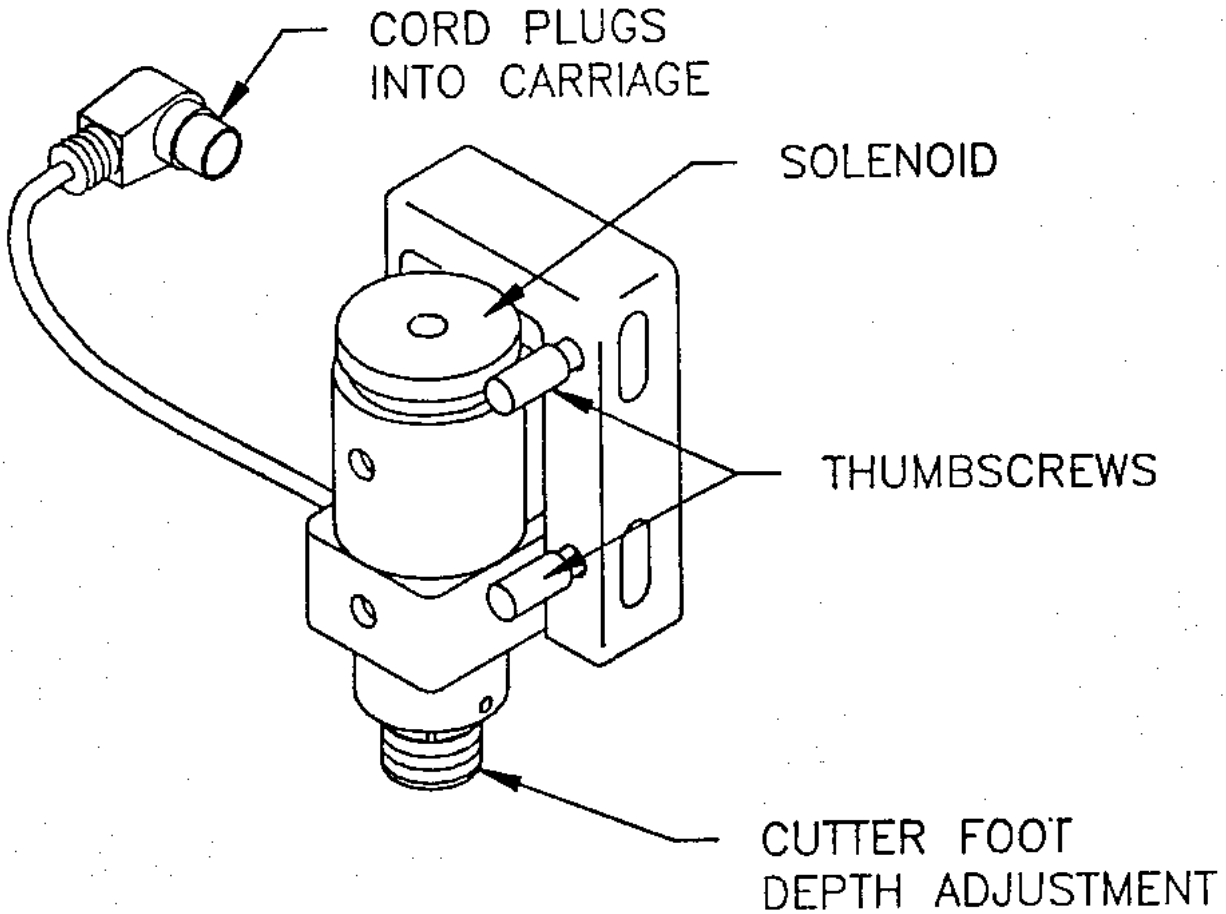
Studio 7 Chassis Left End



Studio 7 Chassis Left End


Y BELT TENSIONER
RIBBON CABLE CARTRIDGE
LEFT END PLATE
CHART HOLD ARM LEVER
TENSION ADJUSTMENT SCREW
CHARTHOLD LIFTER ARM


SOLENOID
CORD PLUGS
INTO CARRIAGE
THUMB SCREWS
PEN
PEN CLAMP SCREW


CORD PLUGS
INTO CARRIAGE
SOLENOID
THUMBSCREWS
CUTTER FOOT
DEPTH ADJUSTMENT

CHAPTER 6

TROUBLE SHOOTING

POOR CUTTING QUALITY

The most common symptom with any cutting equipment is the report of poor cut quality. The Studio7 is designed to give users years of trouble free service. Broken or defective blades cause the highest number of technical assistance inquiries to Ioline. The naked eye cannot detect the broken blade. The following page helps illustrate the proper installation of a new knife blade. Also:

- Before you begin any troubleshooting procedure, a quick inspection of the chart tape can give clues to the origin of the cut quality problem. If the chart tape has tracks in it or is shredded, the operator has a history of cutting too deep. CUTTING TOO DEEP **ALWAYS** RESULTS IN A BROKEN BLADE. Replace the blade and chart tape. We highly encourage testing the cut now to determine cut quality.

- Wavy lines can be caused by a loose carriage or linear slide on the knife assembly. Try switching to the Banner Adaptor to help isolate the cause.

- Check the blade offsets in the Studio Control Center (see Chapter 4). Make sure the OFFSET matches the blade requirements. A 45 degree blade requires a .015 degree offset, a 60 degree blade needs .047 degrees offset and so forth. **Note:** Remember blade specifications do not exactly reflect the blade. A blade offset may differ .002 from the stated offset on the box. Users must sometimes experiment to gain the best cut with a particular knife.

- Weights are used to increase force on the knife assembly. Additional force can help cut reflective or sandblast material. Vinyl does not need additional force. Additional weight cannot correct a bad cut caused by a broken blade.

KNIFE WILL NOT GO UP/DOWN

This symptom can be either constant or intermittant. The most common cause is a malfunctioning knife assembly, but also check:

- Substitute a Banner Adaptor. If the Banner Adaptor works, suspect the knife assembly.
- Make sure the ribbon cable is plugged into the carriage.
- Make sure the knife assembly is properly plugged in.

If the banner adaptor does not work, suspect the logic board or a wiring problem. Look for loose or poor connections.

KEYPAD WILL NOT RESPOND

When the PAUSE and POWER lights are on, the keypad is active and the Studio7 should respond to the movement arrow buttons.

When the PAUSE key is pressed, the Green ready light should be on. **Note:** The Keypad buttons will no longer function unless the PAUSE key is pressed again.

If a key on the pad does not respond, remove the right end plate and inspect the 6 wires and connector. Make sure they are properly seated and installed.

NO POWER

- Check the fuse
- Check the power cord
- Check power at the wall outlet
- Check for proper voltage levels at the power supply
- Check for broken solder connections

The Studio7 has shipped with two types of power supplies over the two years of its product life. 36" (91 cm) Studio7s <V60933407 and 24" (60cm) <J24932903 had one type. This power supply has a large circular transformer and must be set to the local voltage.

Universal power supplies were installed in all Studio7 >V60933407 and >J24932903. This power supply has an operating range of 60-220VAC.

Note: <u>Do not use an old power supply with a new blue logic board</u>. The following combinations are compatible:

1) new universal power supply and new blue board;
2) old switching power supply and green logic board;
3) new universal power supply and green logic board.

REGISTRATION SHIFT (MEDIA SKEWING)

We have found that good tracking is as much a factor of technique as it is one of hardware. Feeding material off the roll, using proper acceleration and speed, optimizing your plots, and implementing alignment guides will give you excellent tracking. If persistent tracking problems exist, check the following:

1) Check the media; is one side heavier than the other? Variations in media quality will effect the performance of the machine. Buckling vinyl can also cause skewing. Make sure the vinyl is feeding smoothly.

2) Closely inspect the chartwheels, look for uneven wear or damage. Foreign material like paint, paper,and dirt, or flat spots from prolonged chartwheel exposure to clamp down positioning while the machine is idle, will contribute to media shift.

3) Check the four grit shaft set screws, 2 in the center, one on each side. Make sure they are tight. These screws may loosen during shipment or after extensive use.

4) Inspect the grit shaft. Look for any foreign material, damage, or unusual wear.

5) Check for square shaft side play. There should be none.

The following procedure pertains to the “Blue Logic Board” for the Studio 7.

Sometimes, clearing the memory of the Studio 7 will solve many problems totally unrelated to the memory. The following procedure will reset the plotter to factory defaults and will dump anything that might be causing the plotter to act differently than expected.

1. Move the carriage to the left end plate.

2. Turn the Studio 7 off and unplug from power source.

3. Remove the row of screws across the front and the back of plotter.

4. Lift plotter off bottom pan and lay on its top on a flat surface.

5. On the main logic board, locate JP2, which is marked clr/run.

6. Jumper the left and middle posts together.

7. Turn machine on.

8. Watch the carriage move to the right. Turn the machine off when the carriage reaches the right end plate.

9. Remove the jumper from JP2.

The memory of the plotter is now reset to factory defaults.

The following installation instructions pertain to versions 2.40 and earlier of the Ioline Control Center.

1. Insert the Control Center disk into the floppy disk drive of your computer.
2. On your Windows Start Bar click on “Start” then “Run”.
3. Select “Browse”.
4. Look in your Floppy Drive A.
5. Double click on the file folder labeled “Win” or “Windows”.
6. Double click on winstall.exe to place the file on the open line of the “Run” window.
7. Click “OK”.
8. Follow the onscreen instructions for proper installation.

The Studio 7 plotter has preprogrammed error conditions, which are defined by a particular colored light sequence emitted from the keypad error light. The error conditions are as follows:

Error Condition	Description	Possible Cause/Solution	
Steady Red	Memory Buffer Overrun or a Major Communication Error	Defective RS-232 cable. Defective computer serial port. Damaged RS-232 interface IC on logic board.	Replace cable. Perform computer port test from control center software to verify, if fails replace serial port. Perform plotter port test from control center software to verify, if fails replace communication chip (102822 IC, RS-232 Interface)
Flashing Red	X-Axis Jam	Paper jammed into grit shaft. Ceased grit shaft bearing(s). Ceased servo motor. Blown transistor(s) on logic board (Position Q1–Q4) Loose x-axis transmission motor pulley. Damaged x-axis transmission gear assy. Loose set screw on flex coupling. Loose set screw on grit shaft assy.	Clear paper jam. Replace grit shaft bearing(s). Manually turn motor shaft; if hard to turn replace servo motor. Test transistor(s) w/ohm meter touching D (drain) & S (source) leads; should read 2.23 mega ohms, replace if reading is less. Inspect and check pulley set screws. Inspect gear for damaged teeth, replace damaged gear. Inspect and check flex coupling set screws. Check all set screws on grit shaft assy.

Flashing Green	Y-Axis	Knife caught on edge of material causing jam. Ceased y-axis transmission bearing(s). Ceased servo motor. Blown transistor(s) on logic board (Position Q5–Q8) Damaged or striped y-axis drive belt teeth. Damaged y-axis transmission gear assy. Loose y-axis transmission motor pulley.	Clear jammed material. Inspect bearing(s) for damage, replace y-axis transmission bearing(s). Manually turn motor shaft, if hard to turn replace servo motor. Test transistor(s) w/ohm meter touching D (drain) & S (source) leads; should read 2.23 mega ohms, replace if reading is less. Inspect and replace drive belt if needed. Inspect gear for damaged teeth, replace damaged gear. Inspect and check pulley set screws.
Alternating Red/Green	Plotter Language Syntax Error or Major Communication Error	Wrong plotter language. Wrong plotter driver. Wrong data transfer protocol settings for serial port Bad or corrupt file/Recreate file. File sent before plotter was placed online. Synchronization problem caused by defective servo motor encoder. Defective computer serial port. Damaged RS-232 interface IC on logic board.	Change plotter language selected in your signmaking software (DMPL or HPGL) Select the driver for Studio 7 in your signmaking software. Check port settings from windows control panel and/or communication settings in your signmaking software (9600 bps, 8 data bits, 1 stop bit, Xon/Xoff or Hardware Handshaking). Abort file, reset plotter power to clear buffer. Clean encoder disk, replace servo motor. Perform computer port test from control center software to verify, if fails replace serial port. Perform plotter port test from control center software to verify, if fails replace communication chip (102822 IC, RS-232 Interface)

Good tracking is as much a factor of technique as it is one of hardware. Feeding material off the roll, using proper acceleration and speed, optimizing your plots, and implementing alignment guides will give you excellent tracking. If persistent tracking problems exist, check the following:

1. Plot Optimization: Most design software provides a sorting feature within the plotter driver setup. Sorting minimizes excessive media movement, which can induce tracking problems.

2. Media Management: Variations in media quality will effect the performance of the machine. Buckling vinyl can also cause skewing. Ensure the vinyl is feeding smoothly.

3. Drive Belt Tension: A loose/worn belt or worn gear can cause the belt to slip on the gears. Check belts and gearing for excessive wear. Properly adjust the tension of all drive belts.

4. Chart Wheels: Inspect the chart wheels for uneven wear or damage. Foreign material like paint, paper, dirt or flat spots from prolonged chart wheels exposure to clamp down positioning while the machine is idle will contribute to media shift.

5. Set Screws: Check the (4) grit shaft set screws, (2) in the center, (1) on each side. Ensure the set screws are fastened properly. Set screws may loosen after extensive use.

6. Grit Shaft: Inspect the grit shaft. Look for any foreign material, damage, or unusual wear.

7. Square Shaft: Check for square shaft side play.

Sending a simple file of Ioline Syntax commands to the plotter can change the settings in the Studio 7.

1. Open any Text Editor *(Ex: Wordpad for Windows/Simple Text for MacIntosh)* and type in the following Ioline Syntax commands: *(*=See note below)*

Command	Function
!HO1	(Enter Ioline syntax, HP-GL 7475 emulation)
PT3	(Page type, custom size)
LL0,0	(Lower left)**
UR800000,22900	(Upper right, sets page size)**
SS100,100	(Scale)**
SR0	(Rotation, off)**
SD50,50	(Pen up/down delay)**
SA10,5	(Acceleration)**
KO15	(Knife offset)
KV10	(Knife overcut)**
KA45	(Knife angle)
UD	(Update)
@;:	(Exit Ioline syntax)

2. Save as: *Studio7default.txt*

3. Press “Starting Point” then “Pause” to place the Studio 7 online.

4. Open a modem terminal program such as “MacTerminal” for MacIntosh or “HyperTerminal” for Windows 95/98.

5. Open the text file named *Studio7default.txt* and send to plotter.

6. If you need to change the rotation of the plot, select one of the following plot rotation commands: SR0 = rotation off, SR1 = 90 degrees clockwise (CW), SR2 = 180 degrees CW, SR3 = 270 degrees CW.

**The above parameters, except for the page size, are the default values for a 24-inch Studio7. The page size has an X-axis value of 800 inches. These numbers can be changed to reflect different needs. For example, to set up the page size for the Studio 7 36" cutter, change the UR800000,22900 to UR800000,34960.*

***Note that all zero values following the two-letter codes are zeros, not Ohs.*

Follow this procedure to test the power supply:

1. Turn off Studio 7 and unplug.

2. Remove the bottom pan screws and remove the pan from the plotter.

3. Lay plotter upside down and inspect power supply for burn marks. If it is damaged replacement is required. If power supply looks normal, continue with test.

4. Plug in plotter and turn it on.

5. Using a voltmeter, check the following settings. *Note: The power supply connector color refers to the color of the wire. The connectors J-3 and J-5 are on the logic board.*

6. Insert the black (negative) test lead into the black connector (J-3) and the red (positive) test lead into the yellow connector. The voltmeter reading should be +33 volts +/- 5%.

7. Insert the black test lead into the black connector (J-3) and the red test lead into the white connector. The voltmeter reading should be +14 volts +/- 5%.

8. Insert the black test lead into the black connector (J-3) and the red test lead into the green connector. The voltmeter reading should be -12 volts +/- 5%.

9. Insert the black test lead into the black connector (J-3) and the red test lead into the blue connector. The voltmeter reading should be +12 volts +/- 5%.

10. Insert the black test lead into the black connector (J-3) and the red test lead into the red connector. The voltmeter reading should be +5 volts +/- 5%.

11. Insert the black test lead into the black connector (J-5) and the red test lead into the red connector. The voltmeter reading should be +20 volts +/- 5%.

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2. A loose carriage or linear slide on the knife assy can cause wavy lines. Try switching to the Banner Adapter to help isolate the cause.

3. Check the blade offsets in the Studio Control Center *(see chapter 4).* Make sure the OFFSET matches the blade requirements. A 45-degree blade requires a .015 degree offset, a 60-degree blade needs a .047 degrees offset and so forth. *Note: Remember blade specifications do not exactly reflect the blade. A blade offset may vary .002 from the stated offset on the box. Users must sometimes experiment to gain the best cut with a particular knife.*

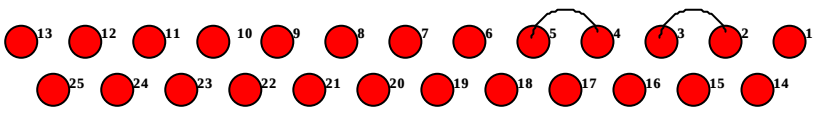
4. Weights are used to increase force on the knife assembly. Additional force can help cut reflective or sandblast material. Vinyl does not need additional force. Additional weight cannot correct a bad cut caused by a broken blade.

If you do not have the loop-back diagnostic module, complete the following steps to test the plotter's serial port:

1. Turn off the Studio 7.

2. Remove the serial cable from the back of the plotter.

3. Using paperclips or short lengths of wire, jumper pins 2 to 3 and 4 to 5. Make sure you get the wires in far enough to make a good connection. The pinholes are labeled on the plotters serial port hardware. The top row is 1 through 13, from right to left, so the pins to jumper are:



4. Turn on the Studio 7 while you hold down the “Test Cut” key on the keypad. Continue holding down “Test Cut” key until Studio 7 beeps and the light flashes three times. This places the plotter in the serial diagnostic mode.

5. Press any “Arrow” key on the plotter keypad. This emulates the transmitting and receiving of characters. The Studio 7 should beep and the light should flash each time an “Arrow” key is pressed.

6. Turn off the Studio 7 after the test. This will take the plotter out of the serial diagnostic mode.

7. Remove the jumpers from the serial port.

If this test passes, then the serial port of the plotter is communicating properly.

The following procedure pertains to the “Green Logic Board” for the Studio 7.

Sometimes, clearing the memory of the Studio 7 will solve many problems totally unrelated to the memory. The following procedure will reset the plotter to factory defaults and will dump anything that might be causing the plotter to act differently than expected.

1. Move the carriage to the left end plate.

2. Turn plotter off and unplug from power source.

3. Remove the row of screws across the front and the back of plotter.

4. Lift plotter off bottom pan and lie on its top on a flat surface.

5. There is a flat, round, silver battery on the board. Remove the battery as you slightly lift the tab that is holding it in place.

6. Once the battery is removed, press the tab that held the battery in place until it touches the surface below.

7. Replace the battery.

8. Next to the battery is JP4, labeled Run / ClrMem. Remove the Jumper from JP4 and move it to the right and center posts.

9. Move the carriage to the left side of the plotter and turn the plotter on. Watch the carriage move to the right. Turn the machine off when the carriage reaches the right end plate.

10. Replace the Jumper on the left and center posts.

The memory of the plotter is now reset to factory defaults.

The purpose of calibration is to heighten the dimensional accuracy of the x-axis and y-axis measurements produced by your Studio 7 Signcutter.

To calibrate your Studio 7 Signcutter:

1. Turn on the Studio 7.

2. On the Studio 7 keypad press “Starting Point” and then “Pause” to place the Studio 7 online.

3. From your computer open the Ioline Control Center software that was originally provided with your machine.

4. From the main menu select “Calibrate” then “Calibrate Plotter”. The “Set Calibration” window should appear.

5. Before calibrating, reset your Studio 7's “Calibration Setting” to its factory default (1.0000), click on “Reset Calibration”.

6. Install media large enough for the calibration plot. See table below:

7. Click on “Calibration Plot” to plot the stored calibration plot. Your Studio 7 will plot a rectangle. See the table below for the size of the rectangle.

8. Measure the lines precisely to 3 decimal places. Average the measured x and y lines of the rectangle. The averaged values are the measured values you will enter into measured fields of the “Calibration Plot” window.

9. Accurately enter the measured values in the fields labeled “Measured”.

10. Click on “Set Calibration”.

11. Your Studio 7 will calibrate itself, and the new “Calibration Setting” will be displayed.

12. Click on “Done” when you are finished.

Calibration Table			
Model	Minimum Media	X-Axis	Y-Axis
Studio 7 36	42” x 40” 107 cm x 102 cm	40“ 101 cm	28” 71 cm
Studio 7 24	42” x 24” 107 cm x 61 cm	40“ 101 cm	20” 51 cm

1. Gently slide the tool carriage to the right end plate.

2. Gently pull on the middle of the tool carriage belt using a spring scale that measures in ounces, grams or both. Exert 300 to 420 (10.5 to 14.8 ounces) to the belt deflecting the belt approximately .5 inches from its natural position.

3. To gain access to the y-axis belt tensioner, remove the left end cover. The belt tensioner is located directly below the ribbon cartridge assembly.

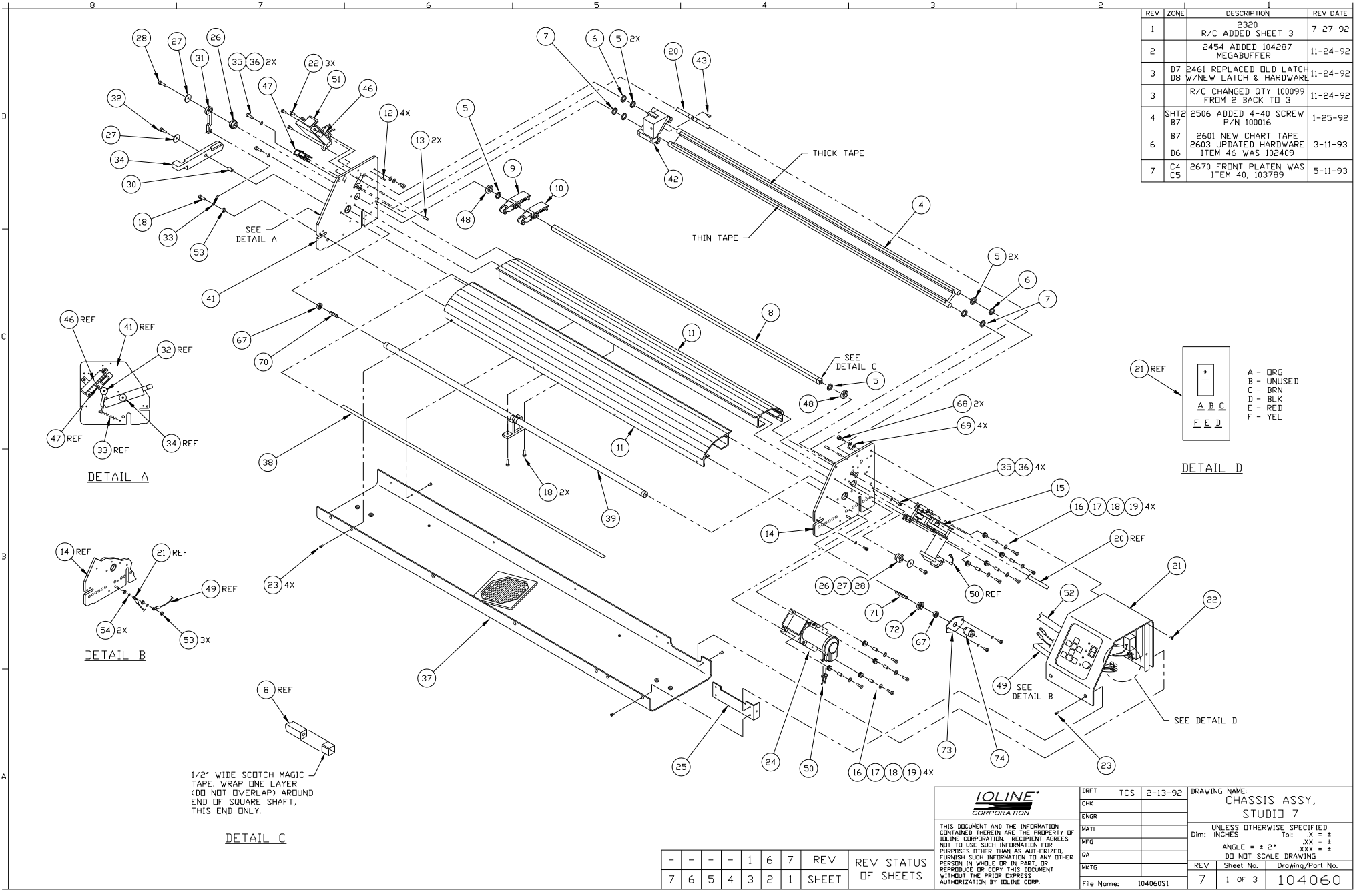
4. Adjust the belt tension screw (9/64" Allen) until you achieve 300 to 420 (10.5 to 14.8 ounces) tension at .5 inch deflection from the belts natural position.

APPENDIX

REFERENCE MATERIALS

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-02	LABOR, FRAME-UP	104060	CHSY ASSY, S7
103789	PLATEN, FRONT, FCC	104060	CHSY ASSY, S7
104287	PCB ASSY, MEGABUFFER, TESTED	104060	CHSY ASSY, S7
102394	TRAVERSE ASSY, 38"	104060	CHSY ASSY, S7
100127	O-RING, .487 ID X .103	104060	CHSY ASSY, S7
103655	O-RING, .426 ID X .070	104060	CHSY ASSY, S7
100126	O-RING, .364 ID X .070	104060	CHSY ASSY, S7
100128	O-RING, .539 ID X .210	104060	CHSY ASSY, S7
102616	SHAFT, SQUARE, 7/16 SQ X 39.05 LG	104060	CHSY ASSY, S7
101864	CHART WHEEL ASSY, LEFT, TWO SPRING	104060	CHSY ASSY, S7
101865	CHART WHEEL ASSY, RIGHT, TWO SPRING	104060	CHSY ASSY, S7
103790	PLATEN, REAR, FCC	104060	CHSY ASSY, S7
103206	PLATE, END, RIGHT, 5000, PLAT WHT	104060	CHSY ASSY, S7
103523	TRANS ASSY, Y-DRIVE, 1000 CT	104060	CHSY ASSY, S7
102945	GROMMET, VIB. DAMP., 0.563 OD, 0.21	104060	CHSY ASSY, S7
103144	SPACER, .166X.250X.312, ALUM	104060	CHSY ASSY, S7
102382	BELT ASSY, Y-DRIVE	104060	CHSY ASSY, S7
104048	COVER ASSY, RIGHT TOP	104060	CHSY ASSY, S7
103494	TRANS ASSY, X-DRIVE, 1000 CT	104060	CHSY ASSY, S7
103792	TAB, MTG, RIGHT FRONT, FCC	104060	CHSY ASSY, S7
104381	BUSHING, SQUARE SHAFT	104060	CHSY ASSY, S7
104293	SPACER, #10 X .312 X .50, SS	104060	CHSY ASSY, S7
102034	ARM, CHART HOLD LIFTER	104060	CHSY ASSY, S7
104291	SPRING, EXTENSION	104060	CHSY ASSY, S7
104292	LEVER, CHART HOLD ARM	104060	CHSY ASSY, S7
101798	BOTTOM PAN ASSY, LONG	104060	CHSY ASSY, S7
101062	TAPE, CUSHION, PEN, .437 WD	104060	CHSY ASSY, S7
104471	TAPE, UHMW, .43 WIDE	104060	CHSY ASSY, S7
102419	GRIT SHAFT ASSY, X AXIS DRIVE	104060	CHSY ASSY, S7
103207	PLATE, END, LEFT, 5000, PLAT WHT	104060	CHSY ASSY, S7
104047	CARRIAGE ASSY, STUDIO 7	104060	CHSY ASSY, S7
104481	CARTRIDGE ASSY, METAL	104060	CHSY ASSY, S7
103826	TENSIONER ASSY	104060	CHSY ASSY, S7
100846	CABLE ASSY, 4000, AC POWER	104060	CHSY ASSY, S7
102892	CABLE ASSY, SERVO MOTOR	104060	CHSY ASSY, S7
102897	CABLE ASSY, 34 PIN COND	104060	CHSY ASSY, S7
102894	CABLE ASSY, 10 PIN COND	104060	CHSY ASSY, S7
100279	CONN, CABLE CLIP	104060	CHSY ASSY, S7
100453	FAN, COOLING, 110V	104060	CHSY ASSY, S7
100108	SPACER, #8 CLR X 7/16 X 1/4 RND	104060	CHSY ASSY, S7
102424	POWER SUPPLY ASSY	104060	CHSY ASSY, S7
103632	CABLE ASSY, 5000 DC POWER	104060	CHSY ASSY, S7
102889	CABLE ASSY, RECTIFIER	104060	CHSY ASSY, S7
104029	PCB ASSY, STUDIO 7 LOGIC BOARD, TES	104060	CHSY ASSY, S7
102397	PLATE, MTG, LOGIC PCB	104060	CHSY ASSY, S7
100316	BEARING, BALL, .25ID, .625OD, .196	104060	CHSY ASSY, S7
102421	PIN, .249 DIA, 1.00 LG	104060	CHSY ASSY, S7
102959	PIN, .249 DIA, 1.50 LG	104060	CHSY ASSY, S7

100555	ADAPTER, BEARING, X-AXIS DRIVE	104060	CHSY ASSY, S7
100827	RETAINER BEARING, GRIT SHAFT, SERVO	104060	CHSY ASSY, S7
100152	COUPLING, ASSY, FLEX	104060	CHSY ASSY, S7
100016	SCREW #4-40, .875 LG, PHP SEMS	104060	CHSY ASSY, S7
103876	PIN, DOWEL, .125 X .75 LG	104060	CHSY ASSY, S7
100079	SPACER, #4, .50 LG, NYLON	104060	CHSY ASSY, S7
103908	SCREW #8-32, .50 LG, PHP SEMS	104060	CHSY ASSY, S7
100111	SPACER, .254ID, .375OD, .030LG, GOL	104060	CHSY ASSY, S7
104007	SCREW #8-32, .312 LG, PHP SEMS	104060	CHSY ASSY, S7
101581	SCREW #8-32, .375 FHP, BLACK	104060	CHSY ASSY, S7
100099	WSHR, #10, .875OD, .06TH, FLAT	104060	CHSY ASSY, S7
103772	SCREW #10-32, .625 LG, SHC, NYLOC	104060	CHSY ASSY, S7
101540	SCREW #10-24, 1.25 LG, PH SQ DR	104060	CHSY ASSY, S7
100056	SCREW #10-24, .75 LG, PH SQ DR	104060	CHSY ASSY, S7
100095	WSHR, #10, LOCK, EXT STAR	104060	CHSY ASSY, S7
100020	SCREW #6-32, .187 LG, PHP	104060	CHSY ASSY, S7
104013	NUT, #8-32, KEP	104060	CHSY ASSY, S7
100087	WSHR, #8, LOCK, EXT	104060	CHSY ASSY, S7
100277	TYRAP, .1 IN X 3 IN	104060	CHSY ASSY, S7
100045	SCREW #8-32, 2.25 LG, PHP	104060	CHSY ASSY, S7
104180	SCREW, #8, .50 LG, SLF TAP, PHP, SE	104060	CHSY ASSY, S7
104337	SCREW #4-40, .375 PHP, SEMS	104060	CHSY ASSY, S7
102321	SCREW #10-32, .25 DIA, .25 LG, SH S	104060	CHSY ASSY, S7
102159	WSHR, .250ID, .500OD, .0626THK, FLA	104060	CHSY ASSY, S7



REV	ZONE	DESCRIPTION	REV DATE
1		2320 R/C ADDED SHEET 3	7-27-92
2		2454 ADDED 104287 MEGABUFFER	11-24-92
3	D7 D8	2461 REPLACED OLD LATCH W/NEW LATCH & HARDWARE	11-24-92
3		R/C CHANGED QTY 100099 FROM 2 BACK TO 3	11-24-92
4	SHT2 B7	2506 ADDED 4-40 SCREW P/N 100016	1-25-92
6	B7 D6	2601 NEW CHART TAPE 2603 UPDATED HARDWARE ITEM 46 WAS 102409	3-11-93
7	C4 C5	2670 FRONT PLATEN WAS ITEM 40, 103789	5-11-93

-	-	-	-	1	6	7	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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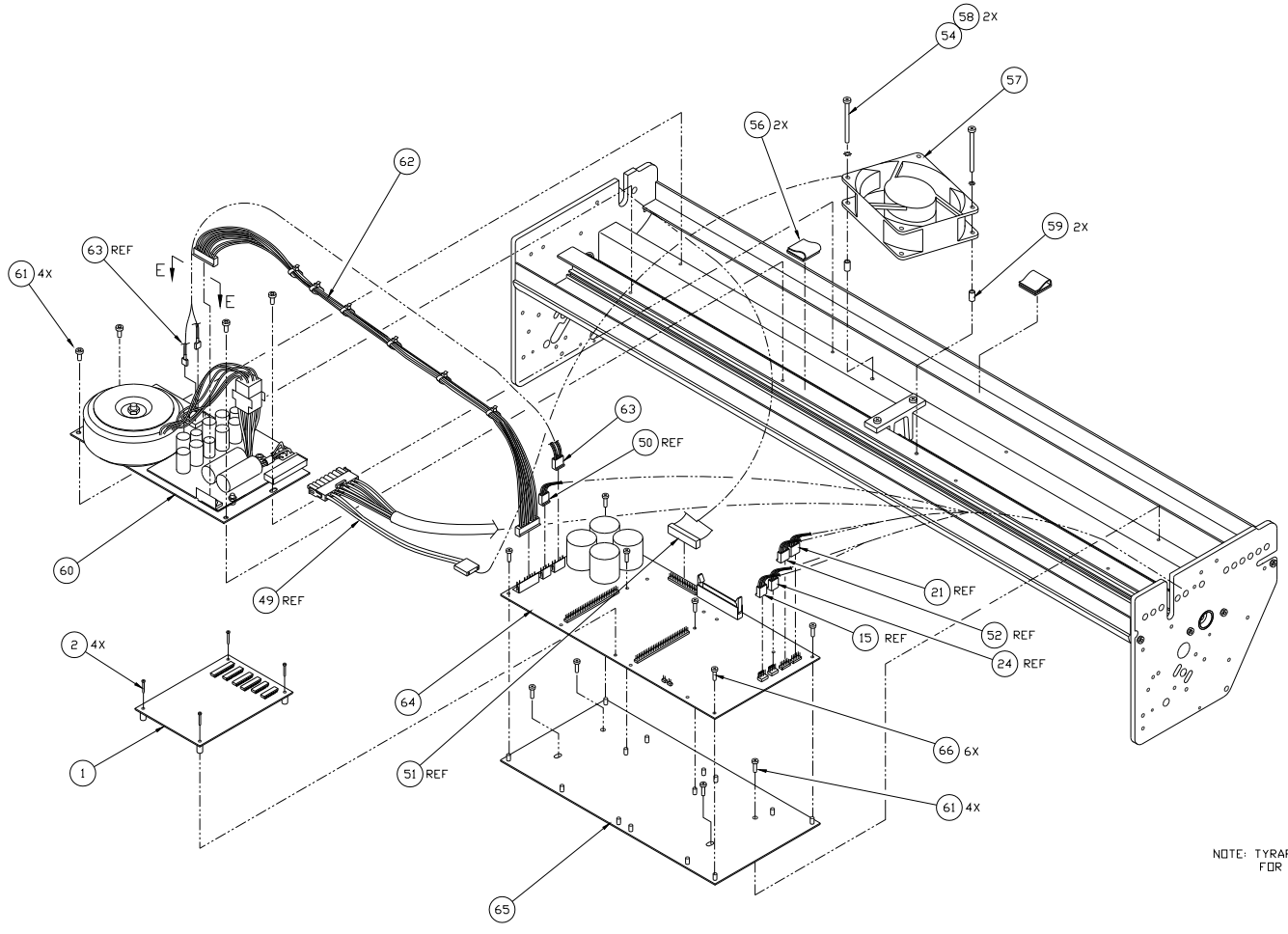
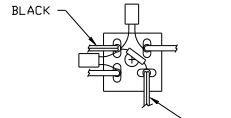
DRFT	TCS	2-13-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	104060S1	

DRAWING NAME: CHASSIS ASSY, STUDIO 7

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± 2° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
7	1 OF 3	104060





VIEW E-E

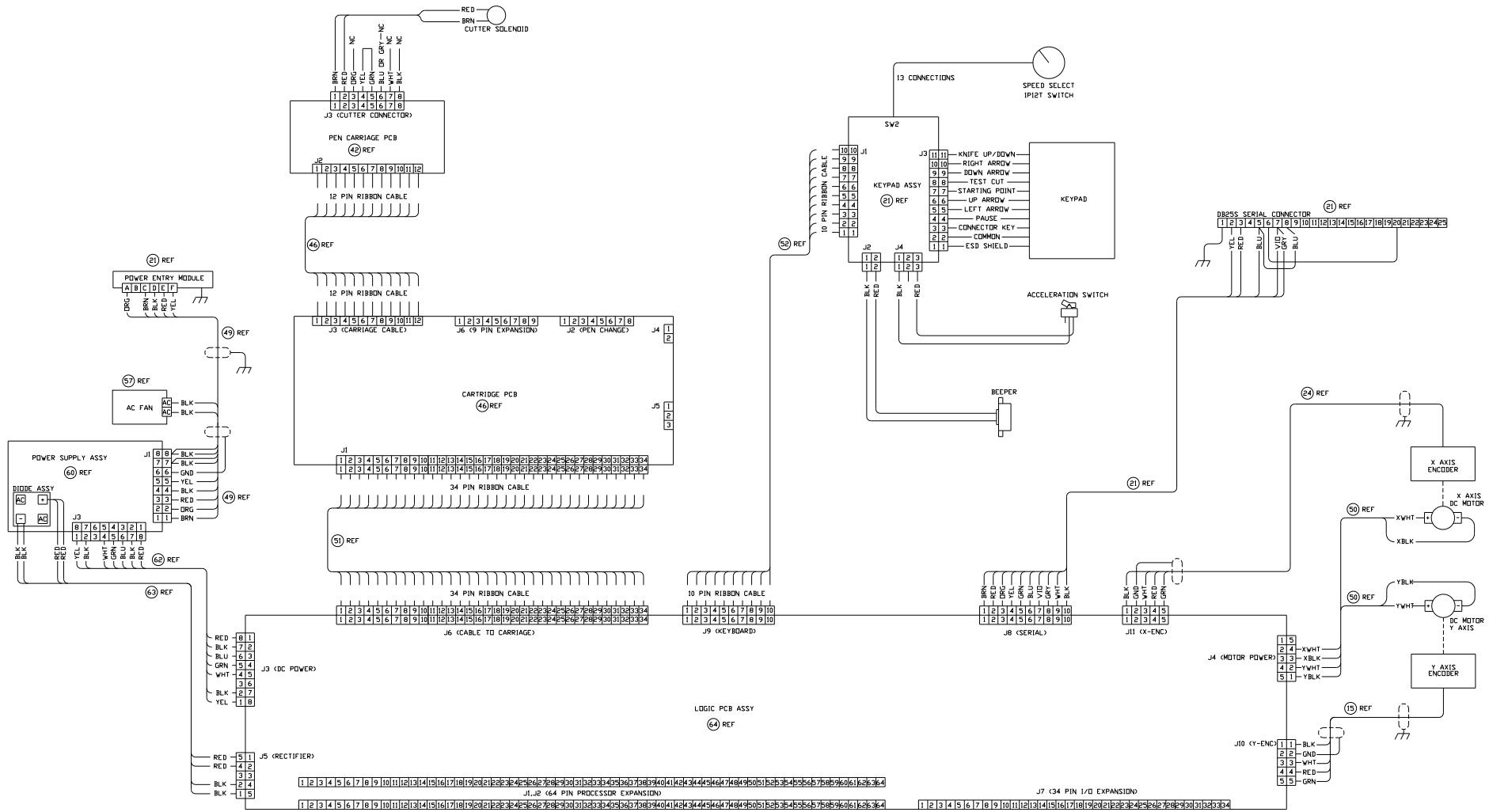
NOTE: TYRAPS, ITEM 55, NOT SHOWN. USE AS REQUIRED FOR GATHERING CABLES.

	By:	Date:
DRFT	TCS	2-14-92
CHK		
APVD		
File Name:	104060S2	

IOLINE CORPORATION

DRAWING NAME: CHASSIS ASSY, STUDIO 7

REV	Sheet No.	Drawing/Part No.
6	2	104060



	By:	Date:	DRAWING NAME:
DRFT	SRS	7-23-92	CHASSIS ASSY, STUDIO 7, WIRING DIAGRAM
CHK			
APVD			
File Name:	104060S3		

REV	Sheet No.	Drawing/Part No.
1	3	104060

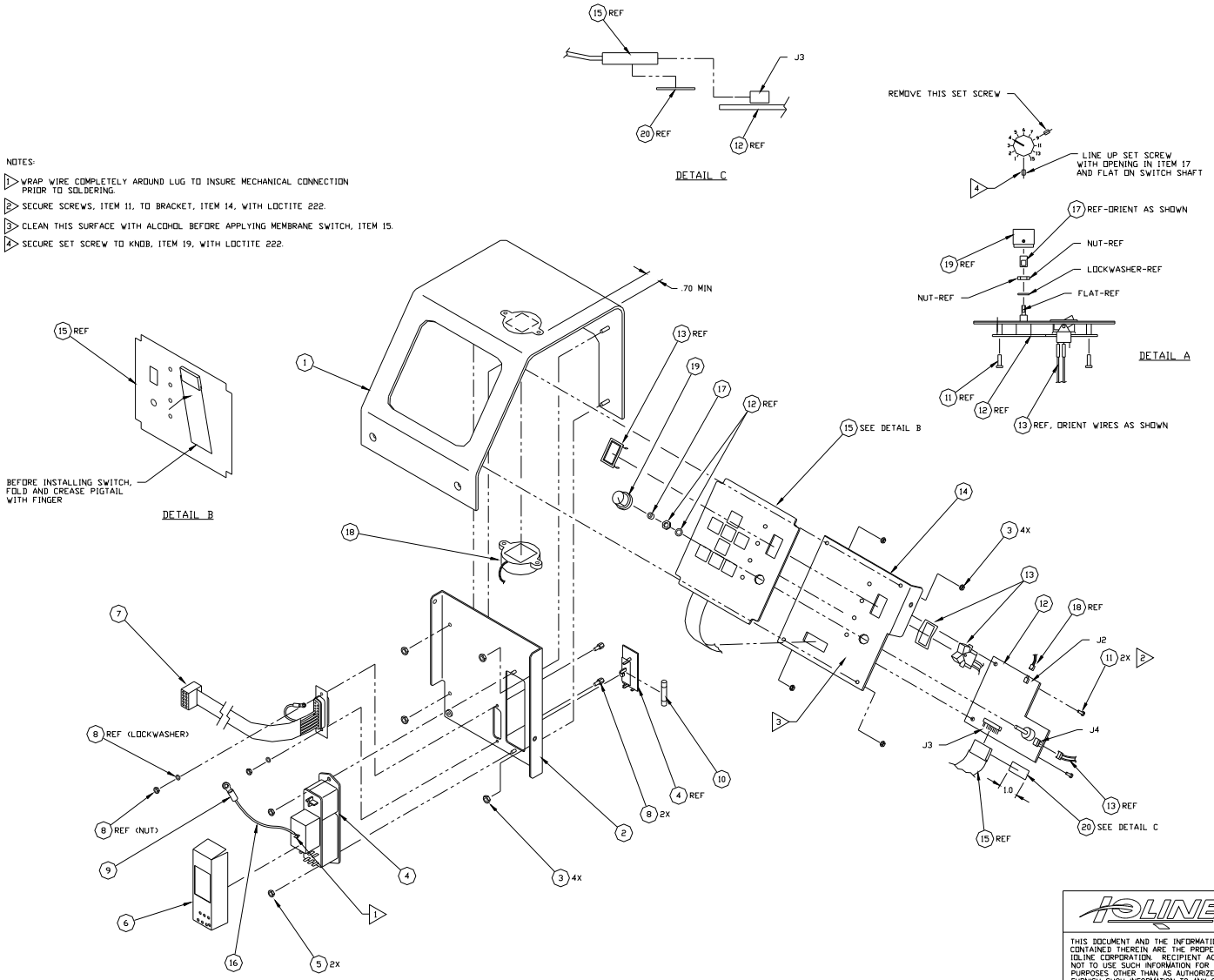
IOLINE CORPORATION

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104048	COVER ASSY, RIGHT TOP
104045	COVER, RIGHT TOP	104048	COVER ASSY, RIGHT TOP
104046	BRACKET, REAR PANEL	104048	COVER ASSY, RIGHT TOP
100305	POWER ENTRY MODULE, W/FUSEHOLDER	104048	COVER ASSY, RIGHT TOP
100830	COVER, RECEPTACLE	104048	COVER ASSY, RIGHT TOP
104093	CABLE ASSY, REAR PANEL	104048	COVER ASSY, RIGHT TOP
100121	JACK SOCKET KIT, #4-40	104048	COVER ASSY, RIGHT TOP
100247	CONN, TERMINAL, RING, #8, 22-16 GA	104048	COVER ASSY, RIGHT TOP
100300	FUSE, 2A, 250V, 3AG S.B.	104048	COVER ASSY, RIGHT TOP
103966	PCB ASSY, KEYPAD	104048	COVER ASSY, RIGHT TOP
104006	SWITCH ASSY, STUDIO 7 KEYPAD	104048	COVER ASSY, RIGHT TOP
104049	BRACKET, SWITCH	104048	COVER ASSY, RIGHT TOP
104077	MEMBRANE SWITCH, STUDIO 7	104048	COVER ASSY, RIGHT TOP
100191	WIRE 18 GA ST GRN X 10 IN UL 1007	104048	COVER ASSY, RIGHT TOP
104015	ADAPTER, KNOB SHAFT, .125/.250	104048	COVER ASSY, RIGHT TOP
103163	BEEPER ASSY	104048	COVER ASSY, RIGHT TOP
104014	KNOB, BLACK, .25 SHAFT	104048	COVER ASSY, RIGHT TOP
106413	KNOB, BLACK, .6 X .77 OD, .25 SHAFT	104048	COVER ASSY, RIGHT TOP
103740	TAPE, FOAM, .5 IN, .025 THICK	104048	COVER ASSY, RIGHT TOP
104012	NUT, #6-32, KEP	104048	COVER ASSY, RIGHT TOP
104011	NUT, #4-40, KEP	104048	COVER ASSY, RIGHT TOP
100014	SCREW #4-40, .375 LG, PHP	104048	COVER ASSY, RIGHT TOP

REV	ZONE	DESCRIPTION	REV DATE
1		2317	6-3-92
2	B4	2414 CORRECTED QTY OF ITEM 8	9-2-92
3	A2	2669 ADDED TAPE 103740	5-11-93
4	B4	4172 106413 WAS 104014 KNOB	5-4-98

NOTES:

1. WRAP WIRE COMPLETELY AROUND LUG TO INSURE MECHANICAL CONNECTION PRIOR TO SOLDERING.
2. SECURE SCREWS, ITEM 11, TO BRACKET, ITEM 14, WITH LOCTITE 222.
3. CLEAN THIS SURFACE WITH ALCOHOL BEFORE APPLYING MEMBRANE SWITCH, ITEM 15.
4. SECURE SET SCREW TO KNOB, ITEM 19, WITH LOCTITE 222.



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DRFT	TCS	1-27-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LB	File Name:	104048

DRAWING NAME: COVER ASSY, RIGHT TOP

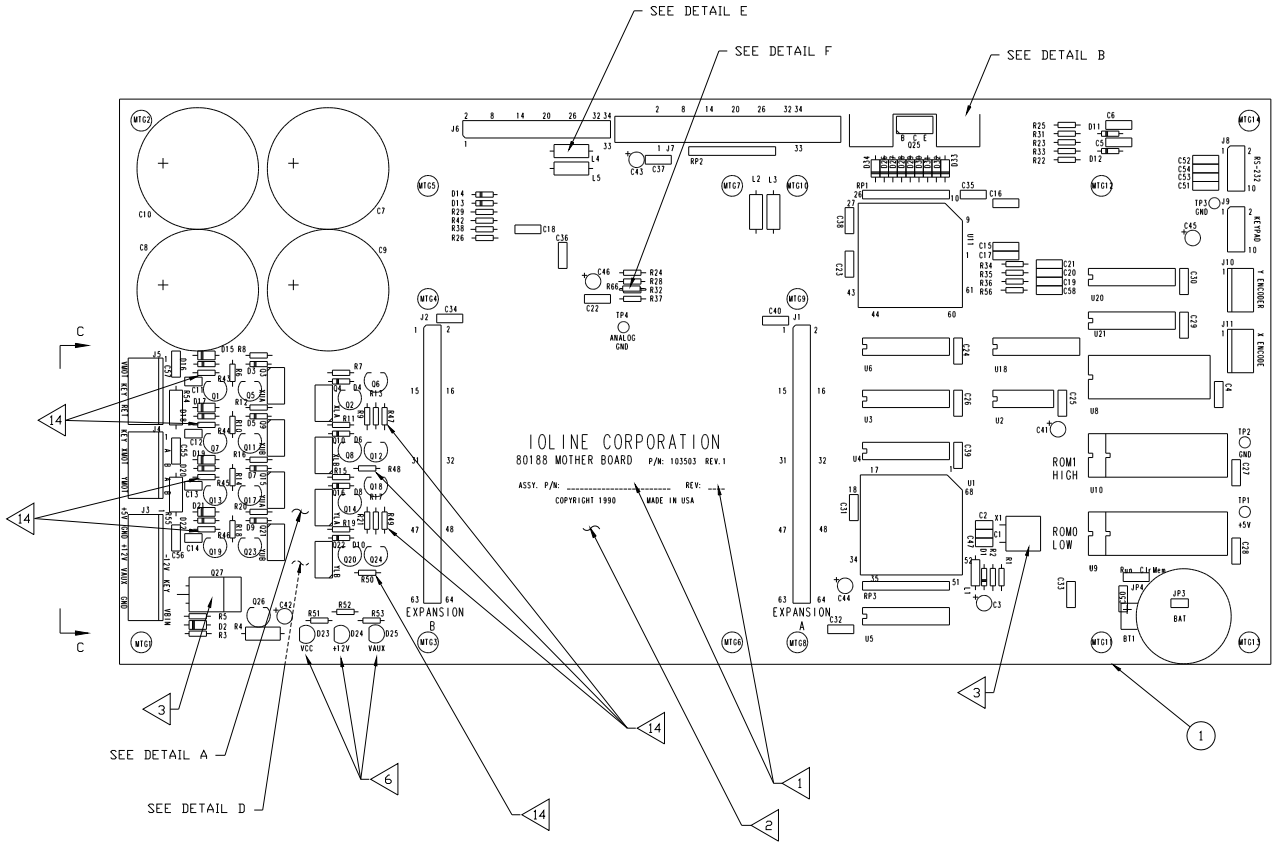
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± . .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
4	1 OF 1	104048

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100238	CONN, SHUNT, 2 PIN	103982	PCB ASSY, 80188 MOTHER BOARD
100260	CONN, HDR, 10 PIN, 2 X 5, MALE	103982	PCB ASSY, 80188 MOTHER BOARD
100335	RES, 100 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
100336	RES, 1K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100342	RES, 220 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100343	RES, 2.2K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100344	RES, 270 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
100346	RES, 33 OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100349	RES, 4.7K OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100350	RES, 510 OHM, 5%, 1/4 W	103982	PCB ASSY, 80188 MOTHER BOARD
100357	CAP, CERAMIC, MONO, .1UF, 50V, .2 L	103982	PCB ASSY, 80188 MOTHER BOARD
100361	CAP, CERAMIC, MONO, 100PF, 50V, .1	103982	PCB ASSY, 80188 MOTHER BOARD
100364	CAP, CERAMIC, MONO, 47PF, 50V, .1 L	103982	PCB ASSY, 80188 MOTHER BOARD
100371	TRANSISTOR, TIP 115 (CAN SUB 117)	103982	PCB ASSY, 80188 MOTHER BOARD
100373	TRANSISTOR, 2N4410, "MOTOROLA ONLY	103982	PCB ASSY, 80188 MOTHER BOARD
100378	LED, RED	103982	PCB ASSY, 80188 MOTHER BOARD
100381	DIODE, 1N4148	103982	PCB ASSY, 80188 MOTHER BOARD
100404	IC, 74LS245	103982	PCB ASSY, 80188 MOTHER BOARD
100405	IC, 74LS273	103982	PCB ASSY, 80188 MOTHER BOARD
100439	SOCKET, IC, 20 PIN DIP, .1 X .3	103982	PCB ASSY, 80188 MOTHER BOARD
101353	CAP, ELEC, ALUM, 10,000UF, 25V (SNA	103982	PCB ASSY, 80188 MOTHER BOARD
101356	RES ARRAY, 4.7K OHM, SIP PU, 10 PIN	103982	PCB ASSY, 80188 MOTHER BOARD
101357	RES ARRAY, 270 OHM, SIP PU, 10 PIN,	103982	PCB ASSY, 80188 MOTHER BOARD
101360	CONN, HDR, 3 PIN, 1 X 3, .1 SP, GO	103982	PCB ASSY, 80188 MOTHER BOARD
101376	TAPE, FOAM DOUBLE COAT, .5 IN	103982	PCB ASSY, 80188 MOTHER BOARD
102064	RES ARRAY, 1K OHM, SIP PU, 10 PIN,	103982	PCB ASSY, 80188 MOTHER BOARD
102441	CAP, TANT, 10UF, 15V, .1SP	103982	PCB ASSY, 80188 MOTHER BOARD
102445	IC, NVRAM CTLR, DS1210 CMOS, (BAT	103982	PCB ASSY, 80188 MOTHER BOARD
102450	CAP, CERAMIC, MONO, 22PF, 50V, .1 L	103982	PCB ASSY, 80188 MOTHER BOARD
102465	TRANSISTOR, MPSA06, 80V, 500MA, TO-	103982	PCB ASSY, 80188 MOTHER BOARD
102796	HOLDER, BATTERY, .91DIA, .12THK	103982	PCB ASSY, 80188 MOTHER BOARD
102797	CAP, ELEC, TANT, 10UF, 25V, .1 LEAD	103982	PCB ASSY, 80188 MOTHER BOARD
102798	CAP, CERAMIC, MONO, .47UF, 50V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
102799	DIODE, ZENER, 1N5228B, 3.9V	103982	PCB ASSY, 80188 MOTHER BOARD
102800	CONN, HDR, 5 PIN, 1 X 5, .156 SP, W	103982	PCB ASSY, 80188 MOTHER BOARD
102801	CONN, HDR, 8 PIN, 1 X 8, .156 SP,	103982	PCB ASSY, 80188 MOTHER BOARD
102804	CONN, HDR, 34 PIN, 2 X 17	103982	PCB ASSY, 80188 MOTHER BOARD
102805	CONN, HDR, 64 PIN, 2 X 32	103982	PCB ASSY, 80188 MOTHER BOARD
102807	TRANSISTOR, IRF540 FET TO-220	103982	PCB ASSY, 80188 MOTHER BOARD
102808	RES, 1.0 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102809	RES, 365 OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102810	RES, 360 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102811	RES, 1.1 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102812	RES, 12.7K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102813	RES, 4.7 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102814	RES, 360K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102816	RES, 270K OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
102817	SOCKET, IC, 68 PIN, PLCC, WO/WIRE B	103982	PCB ASSY, 80188 MOTHER BOARD

102818	IC, 74ALS08	103982	PCB ASSY, 80188 MOTHER BOARD
102821	IC, O.C. DRIVER, ULN2064	103982	PCB ASSY, 80188 MOTHER BOARD
102822	IC, RS232 INTER, 145406	103982	PCB ASSY, 80188 MOTHER BOARD
102823	IC, D/A CONV, DAC0808	103982	PCB ASSY, 80188 MOTHER BOARD
102824	IC, 4-CHAN, A/D CONV, ADC0844	103982	PCB ASSY, 80188 MOTHER BOARD
102825	TEST POINT, TURRET-SWAGE, .094 HOLE	103982	PCB ASSY, 80188 MOTHER BOARD
102829	IC, DUAL H-BRIDGE SW, UDN2993B	103982	PCB ASSY, 80188 MOTHER BOARD
102830	IC, PAL, PROG 16L8, SERVOPEN	103982	PCB ASSY, 80188 MOTHER BOARD
102831	IC, OP W/COMP, LM392	103982	PCB ASSY, 80188 MOTHER BOARD
102837	CAP, CERAMIC, MONO, .01UF, 50V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
102883	HEAT SINK, TO-220, 1.55 X .375, PC	103982	PCB ASSY, 80188 MOTHER BOARD
102988	RES, 2.2 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103039	IC, MICROPROCESSOR, 80188-12, PLCC	103982	PCB ASSY, 80188 MOTHER BOARD
103040	CRYSTAL, 24.576 MHZ	103982	PCB ASSY, 80188 MOTHER BOARD
103042	IC, RAM, STATIC, 32KX8, 62256LP, 12	103982	PCB ASSY, 80188 MOTHER BOARD
103083	FERRITE BEAD, 0-40 MHZ, .21 OD X .4	103982	PCB ASSY, 80188 MOTHER BOARD
103154	CAP, CERAMIC, MONO, 220PF, 25V, .2	103982	PCB ASSY, 80188 MOTHER BOARD
103155	INDUCTOR, 8.2MH, RES.FREQ. 40 MHZ,	103982	PCB ASSY, 80188 MOTHER BOARD
103158	CONN, HDR, 5 PIN, 1 X 5, .100 SP, W	103982	PCB ASSY, 80188 MOTHER BOARD
103261	IC, SN754410-NE, DRIVER, QUADRUPLE	103982	PCB ASSY, 80188 MOTHER BOARD
103293	IC, HEX INVERTER, 74ACT04	103982	PCB ASSY, 80188 MOTHER BOARD
103397	SOCKET, IC, 32 PIN DIP, .1 X .6 MAC	103982	PCB ASSY, 80188 MOTHER BOARD
103418	DIODE, ZENER, 1N5230B, 4.7V	103982	PCB ASSY, 80188 MOTHER BOARD
103724	RES, 4.7 OHM, 5%, 1W	103982	PCB ASSY, 80188 MOTHER BOARD
103725	RES, 680 OHM, 5%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103928	RES, 33 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
103938	ZIPLOCK BAG, STATIC, 12 X 16	103982	PCB ASSY, 80188 MOTHER BOARD
103941	IC, 74ALS573	103982	PCB ASSY, 80188 MOTHER BOARD
103946	RES, 47 OHM, 5%, 1/2W	103982	PCB ASSY, 80188 MOTHER BOARD
103995	RES, 1K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103996	DIODE, 1N5818	103982	PCB ASSY, 80188 MOTHER BOARD
103997	RES, 2K OHM, 1%, 1/4W	103982	PCB ASSY, 80188 MOTHER BOARD
103998	FET, VN10LM	103982	PCB ASSY, 80188 MOTHER BOARD
103999	DIODE, 1N5247	103982	PCB ASSY, 80188 MOTHER BOARD
104020	CAP,DISC/MONO,100PF,5% NPO/COG,50V,	103982	PCB ASSY, 80188 MOTHER BOARD
104594	RES, 1.0 OHM, 5%, 1/2 W	103982	PCB ASSY, 80188 MOTHER BOARD
103503	PCB, 80188-FCC MOTHER BOARD	103982	PCB ASSY, 80188 MOTHER BOARD
102878	INSULATOR, FOR TO220, .600 SP	103982	PCB ASSY, 80188 MOTHER BOARD
102963	HEAT SINK, FOR TO220, .600 SP	103982	PCB ASSY, 80188 MOTHER BOARD
101374	WIRE 20 GA SOLID TINNED, UL 1007/1	103982	PCB ASSY, 80188 MOTHER BOARD
103868	TUBE, TEFLON, CLEAR, 24 GA	103982	PCB ASSY, 80188 MOTHER BOARD
104560	SCREW #4-40, .250 PHP, SEMS	103982	PCB ASSY, 80188 MOTHER BOARD
100120	WSHR, SHLDER, #4 X .031, NYLON	103982	PCB ASSY, 80188 MOTHER BOARD
104337	SCREW #4-40, .375 PHP, SEMS	103982	PCB ASSY, 80188 MOTHER BOARD
101871	WSHR, #4, FLAT, STEEL	103982	PCB ASSY, 80188 MOTHER BOARD
101601	NUT, #4-40, HEX, THIN NYLOCK	103982	PCB ASSY, 80188 MOTHER BOARD
103153	WSHR, .120ID, .180OD, .032TH, FLAT,	103982	PCB ASSY, 80188 MOTHER BOARD

REV	ZONE	DESCRIPTION	REV DATE
3		2238 2258 2379	7-21-92
4	B4	2389 REMOVED JP1, JP2	8-31-92
5	B5 C4	2403 ADDED J7 2403 ADDED C21, R34	8-31-92
5		R/C CLAIRIFIED DETAIL D	8-31-92
6		2656 SCREW ITEM 3 WAS 100012, SCREW ITEM 7 WAS 100014	5-4-93
7		2758 REMOVE 102808 QTY 1, ADD 104594	8-30-93



NOTES:

1. PART MARK BOARD WITH PART NUMBER AND REV LEVEL, PART NUMBER AND REV LEVEL TO REFLECT THIS DRAWING.
2. ADD SERIAL NO. IN LOCATION SHOWN USING PERMANENT BLACK INK.
   - AA — VENDOR'S INITIALS
   - BBBB — PURCHASE ORDER NO.
   - CC — YEAR OF ASSY
   - DD — WEEK OF YEAR OF ASSY
   - EEE — INDIVIDUAL BOARD NUMBER
3. INSTALL X1 AND Q27 ON BOARD WITH DOUBLE BACKED FOAM TAPE.
4. TRIM PIN (KEY) FLUSH WITH BASE OF CONNECTOR.
5. SHUNT JUMPER TO BE ON PINS 1 AND 2.
6. ORIENT D23, D24, AND D25 AS SHOWN ON THIS DRAWING, NOT AS SILKSCREENED ON PCB.
7. CAPACITOR MUST LAY FLAT ON BOARD.

10. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.

11. KEEP RESISTOR LEADS SHORT, BUT DO NOT STRESS RESISTORS BY BENDING THEM TOO HARD.
12. INSULATE COMPONENT LEADS WITH TUBING, ITEM 16.
13. PLACE COMPONENTS EXACTLY AS SHOWN. COMPONENTS MUST NOT REST ON CLIPPED (SHARP) LEAD ENDS. COMPONENTS MUST NOT OBSCURE PADS; AN AUTOMATED PROBING SYSTEM WILL BE USED THAT REQUIRES ACCESS TO THESE PADS.
14. DO NOT INSTALL RESISTORS IN LOCATIONS R43-R50, INSTALL CAPACITORS C62-C69 INSTEAD.

-	-	-	-	7	5	7	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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DRFT	CS	2-18-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103982S1	

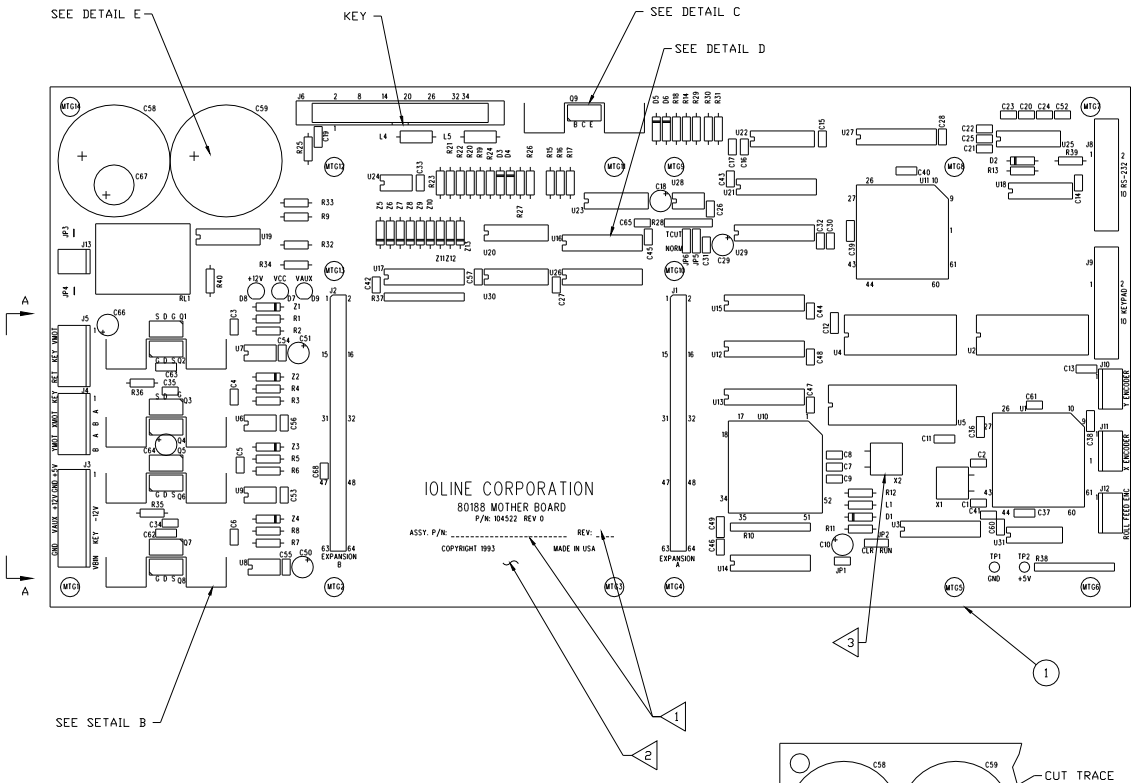
DRAWING NAME: PCB ASSY, 80188 MOTHER BOARD

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1 .XX = ± .03 .XXX = ± .010
ANGLE = ± 3°
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
7	1 OF 3	103982

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100336	RES, 1K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100342	RES, 220 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100343	RES, 2.2K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100344	RES, 270 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
100349	RES, 4.7K OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
100350	RES, 510 OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
100353	RES ARRAY, 3.3K OHM, SIP PU, 6 PIN,	104523	PCB ASSY, 80188 LOGIC BOARD
100361	CAP, CERAMIC, MONO, 100PF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
100364	CAP, CERAMIC, MONO, 47PF, 50V, .1 L	104523	PCB ASSY, 80188 LOGIC BOARD
100371	TRANSISTOR, TIP 115 (CAN SUB 117)	104523	PCB ASSY, 80188 LOGIC BOARD
100378	LED, RED	104523	PCB ASSY, 80188 LOGIC BOARD
100381	DIODE, 1N4148	104523	PCB ASSY, 80188 LOGIC BOARD
100404	IC, 74LS245	104523	PCB ASSY, 80188 LOGIC BOARD
100405	IC, 74LS273	104523	PCB ASSY, 80188 LOGIC BOARD
100436	SOCKET, IC, 8 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100438	SOCKET, IC, 16 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100439	SOCKET, IC, 20 PIN DIP, .1 X .3	104523	PCB ASSY, 80188 LOGIC BOARD
100917	IC, 74LS157	104523	PCB ASSY, 80188 LOGIC BOARD
101356	RES ARRAY, 4.7K OHM, SIP PU, 10 PIN	104523	PCB ASSY, 80188 LOGIC BOARD
101360	CONN, HDR, 3 PIN, 1 X 3, .1 SP, GO	104523	PCB ASSY, 80188 LOGIC BOARD
101374	WIRE 20 GA SOLID TINNED, UL 1007/1	104523	PCB ASSY, 80188 LOGIC BOARD
102064	RES ARRAY, 1K OHM, SIP PU, 10 PIN,	104523	PCB ASSY, 80188 LOGIC BOARD
102450	CAP, CERAMIC, MONO, 22PF, 50V, .1 L	104523	PCB ASSY, 80188 LOGIC BOARD
102797	CAP, ELEC, TANT, 10UF, 25V, .1 LEAD	104523	PCB ASSY, 80188 LOGIC BOARD
102798	CAP, CERAMIC, MONO, .47UF, 50V, .2	104523	PCB ASSY, 80188 LOGIC BOARD
102800	CONN, HDR, 5 PIN, 1 X 5, .156 SP, W	104523	PCB ASSY, 80188 LOGIC BOARD
102801	CONN, HDR, 8 PIN, 1 X 8, .156 SP,	104523	PCB ASSY, 80188 LOGIC BOARD
102805	CONN, HDR, 64 PIN, 2 X 32	104523	PCB ASSY, 80188 LOGIC BOARD
102806	CONN, HDR, 2 PIN, 1 X 2, .1 SP	104523	PCB ASSY, 80188 LOGIC BOARD
102808	RES, 1.0 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102809	RES, 365 OHM, 1%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102810	RES, 360 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102811	RES, 1.1 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102812	RES, 12.7K OHM, 1%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102813	RES, 4.7 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102814	RES, 360K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102816	RES, 270K OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
102817	SOCKET, IC, 68 PIN, PLCC, WO/WIRE B	104523	PCB ASSY, 80188 LOGIC BOARD
102821	IC, O.C. DRIVER, ULN2064	104523	PCB ASSY, 80188 LOGIC BOARD
102822	IC, RS232 INTER, 145406	104523	PCB ASSY, 80188 LOGIC BOARD
102823	IC, D/A CONV, DAC0808	104523	PCB ASSY, 80188 LOGIC BOARD
102824	IC, 4-CHAN, A/D CONV, ADC0844	104523	PCB ASSY, 80188 LOGIC BOARD
102825	TEST POINT, TURRET-SWAGE, .094 HOLE	104523	PCB ASSY, 80188 LOGIC BOARD
102829	IC, DUAL H-BRIDGE SW, UDN2993B	104523	PCB ASSY, 80188 LOGIC BOARD
102830	IC, PAL, PROG 16L8, SERVOPEN	104523	PCB ASSY, 80188 LOGIC BOARD
102831	IC, OP W/COMP, LM392	104523	PCB ASSY, 80188 LOGIC BOARD
102988	RES, 2.2 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
103039	IC, MICROPROCESSOR, 80188-12, PLCC	104523	PCB ASSY, 80188 LOGIC BOARD

103040	CRYSTAL, 24.576 MHZ	104523	PCB ASSY, 80188 LOGIC BOARD
103042	IC, RAM, STATIC, 32KX8, 62256LP, 12	104523	PCB ASSY, 80188 LOGIC BOARD
103083	FERRITE BEAD, 0-40 MHZ, .21 OD X .4	104523	PCB ASSY, 80188 LOGIC BOARD
103155	INDUCTOR, 8.2MH, RES.FREQ. 40 MHZ,	104523	PCB ASSY, 80188 LOGIC BOARD
103158	CONN, HDR, 5 PIN, 1 X 5, .100 SP, W	104523	PCB ASSY, 80188 LOGIC BOARD
103261	IC, SN754410-NE, DRIVER, QUADRUPLE	104523	PCB ASSY, 80188 LOGIC BOARD
103397	SOCKET, IC, 32 PIN DIP, .1 X .6 MAC	104523	PCB ASSY, 80188 LOGIC BOARD
103418	DIODE, ZENER, 1N5230B, 4.7V	104523	PCB ASSY, 80188 LOGIC BOARD
103725	RES, 680 OHM, 5%, 1/4W	104523	PCB ASSY, 80188 LOGIC BOARD
103798	IC, ROM, EE, X24C16, XICOR	104523	PCB ASSY, 80188 LOGIC BOARD
103941	IC, 74ALS573	104523	PCB ASSY, 80188 LOGIC BOARD
104318	CONN, HDR, 2 PIN, .156 SP, W/LOCK	104523	PCB ASSY, 80188 LOGIC BOARD
104528	CONN, HDR, 2 X 5 MALE, W/LATCHES	104523	PCB ASSY, 80188 LOGIC BOARD
104531	CAP, CERAMIC, MONO, .022UF, 50V, .	104523	PCB ASSY, 80188 LOGIC BOARD
104532	CAP, CERAMIC, MONO, .1UF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104533	CAP, CERAMIC, MONO, .01UF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104534	CAP, CERAMIC, MONO, 220PF, 50V, .1	104523	PCB ASSY, 80188 LOGIC BOARD
104535	CAP, CERAMIC, MONO, .33UF, 50V, .2	104523	PCB ASSY, 80188 LOGIC BOARD
104536	IC, MICROPROCESSR, ADSP-2105	104523	PCB ASSY, 80188 LOGIC BOARD
104537	IC, 74HC32, QUAD OR, CMOS	104523	PCB ASSY, 80188 LOGIC BOARD
104538	RES, 47 OHM, 5%, 1/4 W	104523	PCB ASSY, 80188 LOGIC BOARD
104539	TRANSISTOR, P MOSFET	104523	PCB ASSY, 80188 LOGIC BOARD
104540	IC, TC4426, DUAL MOSFET DRIVER	104523	PCB ASSY, 80188 LOGIC BOARD
104541	CRYSTAL, 10.000 MHZ, HC49	104523	PCB ASSY, 80188 LOGIC BOARD
104542	DIODE, ZENER, IN5237B, 8.2V	104523	PCB ASSY, 80188 LOGIC BOARD
102807	TRANSISTOR, IRF540 FET TO-220	104523	PCB ASSY, 80188 LOGIC BOARD
104545	SOCKET, IC, 28 PIN, MACH PIN	104523	PCB ASSY, 80188 LOGIC BOARD
100365	CAP, ELEC, ALUM, 470UF, 25V, RADIAL	104523	PCB ASSY, 80188 LOGIC BOARD
103938	ZIPLOCK BAG, STATIC, 12 X 16	104523	PCB ASSY, 80188 LOGIC BOARD
104581	CONN, HDR, 2 X 17 PIN, W/EJECT	104523	PCB ASSY, 80188 LOGIC BOARD
104594	RES, 1.0 OHM, 5%, 1/2 W	104523	PCB ASSY, 80188 LOGIC BOARD
104885	HEATSINK, MACHINED	104523	PCB ASSY, 80188 LOGIC BOARD
104614	HEAT SINK, TO-220	104523	PCB ASSY, 80188 LOGIC BOARD
101353	CAP, ELEC, ALUM, 10,000UF, 25V (SNA	104523	PCB ASSY, 80188 LOGIC BOARD
105858	TRANSISTOR, MTP23P06V, PMOSFET	104523	PCB ASSY, 80188 LOGIC BOARD
104522	PCB, 80188 MOTHER BOARD	104523	PCB ASSY, 80188 LOGIC BOARD
101601	NUT, #4-40, HEX, THIN NYLOCK	104523	PCB ASSY, 80188 LOGIC BOARD
104337	SCREW #4-40, .375 PHP, SEMS	104523	PCB ASSY, 80188 LOGIC BOARD
101397	WIRE 18 GA ST BLK, 6 IN, UL 1007	104523	PCB ASSY, 80188 LOGIC BOARD



REV	ZONE	DESCRIPTION	REV DATE
1		2728	9-1-93
2		2758 CHG R25, WAS 102828 IS 104594	9-1-93
3		2762 ADD U3 104526	9-1-93
4	B2	2783 ADD NOTE 6	9-1-93
5		2790 REMOVED 104530 (U11) AND 104526 (U3)	9-14-93
6		2793 HEATSINK WAS 102883 IS 104614. RAMOVE RELAY 104582	10-13-93
7	B2	2807 ADD NOTE 7	10-13-93
8		2870 REMOVE 104256 GAL 16V8-15	3-11-94
9		2878 REMOVE 104614 HEATSINK, ADD 104885	3-11-94
10		3187 ADD 104535 CAP.	2-28-95
11		3239 104614 HEATSINK WAS 104885 HEATSINK	2-28-95
12	B3 A3	3286 ADD 101353 CAP. ADD DETAIL E AND JUMPER	4-20-95
13		3552 ADD 101397 WIRE	5-8-96
14		3661 104532 WAS 104531 (C3,4,5,6); 102808 WAS 104538 (R1,4,5,8); 105858 WAS 104539 (Q1,3,5,7)	9-17-96

NOTES:

1. PART MARK BOARD WITH PART NUMBER AND REV LEVEL. PART NUMBER AND REV LEVEL TO REFLECT THIS DRAWING.
2. ADD SERIAL NO. IN LOCATION SHOWN USING PERMANENT BLACK INK.

   AA BBBB CC DD EEE
   - EEE: INDIVIDUAL BOARD NUMBER
   - DD: WEEK OF YEAR OF ASSY
   - CC: YEAR OF ASSY
   - BBBB: PURCHASE ORDER NO.
   - AA: VENDOR'S INITIALS
3. INSTALL X1 AND X2 ON BOARD WITH DOUBLE BACKED FOAM TAPE.
4. TRIM PIN (KEY) FLUSH WITH BASE OF CONNECTOR.
5. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.
6. MAX LEAD LENGTH FROM SOLDER SIDE OF BOARD (AFTER SOLDERING) .06" MAX.
7. COMPONENT HEIGHT (FROM COMPONENT SIDE OF BOARD) 1.22 MAX.

-	-	-	-	-	14	14	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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DRFT	CS	5-26-93
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		

LB | File Name: 104523

DRAWING NAME: PCB ASSY, 80188 LOGIC BOARD

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±, .XX = ±, ANGLE = ± °, .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
14	1 OF 2	104523

RUN

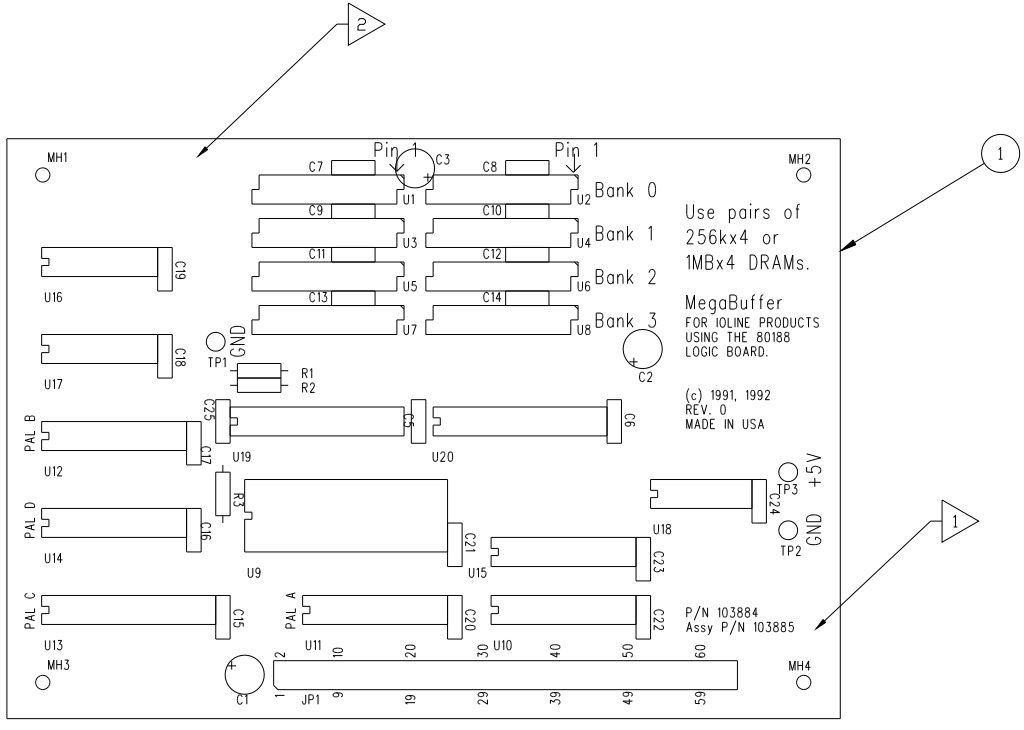
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

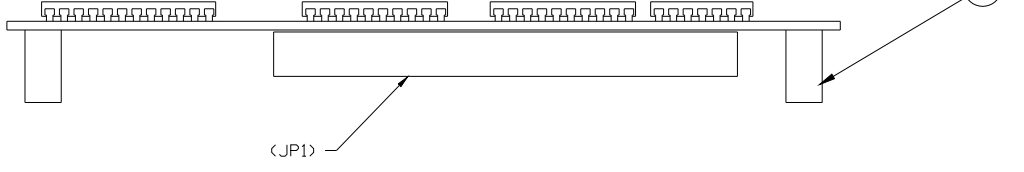
U10 80C188-12
U1 ADSP-2105
U2 27C512
U3 74LS573
U4 74LS573
U5 27C040
U4 62256-120
U15 74LS245
U16 74LS273
U21 74LS273
U22 DAC08C
U18 74LS157
U19 ULN2064
U20 ULN2064
U11 100A
U12 74LS573
U13 74LS573
U7 74LS573
U31 74HC32
U23 UDN2993B
U24-B LM392
U24-A LM392
U9 TC4426
U8 TC4426
U7 TC4426
U6 TC4426
U30 SN754410
U25 MC145406
U26 74LS273
U27 16L8
U28 X24C16
U29 ADC0844
MAIN POWER CONNECTOR
JP1 HDR 1X2
JP2 HEADER 1x2
JP3 JMPR WIRE
JP4 JMPR WIRE
JP5 HEADER 1x3
JP6 HEADER 1x3
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)
(PREVIOUSLY CARGND)

COMPANY: IOLINE			
TITLE: PCB ASSY, 8018B MOTHER BOARD			
DRAWN: CS	DATED: 5-26-93		
CHECKED:	DATED:	CODE:	SIZE: DRAWING NO: 104523 REV: 14
QUALITY CONTROL:	DATED:		
RELEASED:	DATED:	SCALE:	SHEET:2 OF2

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100336	RES, 1K OHM, 5%, 1/4W	103885	PCB ASSY, MEGABUFFER, 1M RAM
100346	RES, 33 OHM, 5%, 1/4 W	103885	PCB ASSY, MEGABUFFER, 1M RAM
100357	CAP, CERAMIC, MONO, .1UF, 50V, .2 L	103885	PCB ASSY, MEGABUFFER, 1M RAM
100404	IC, 74LS245	103885	PCB ASSY, MEGABUFFER, 1M RAM
100407	IC, 74LS393	103885	PCB ASSY, MEGABUFFER, 1M RAM
101346	IC, 74LS574	103885	PCB ASSY, MEGABUFFER, 1M RAM
102441	CAP, TANT, 10UF, 15V, .1SP	103885	PCB ASSY, MEGABUFFER, 1M RAM
102798	CAP, CERAMIC, MONO, .47UF, 50V, .2	103885	PCB ASSY, MEGABUFFER, 1M RAM
102825	TEST POINT, TURRET-SWAGE, .094 HOLE	103885	PCB ASSY, MEGABUFFER, 1M RAM
103077	CONN, HDR, 64 PIN, 2 X 32, FEMALE	103885	PCB ASSY, MEGABUFFER, 1M RAM
103935	ZIPLOCK BAG, STATIC, 6 X 8	103885	PCB ASSY, MEGABUFFER, 1M RAM
104254	IC, PLD, PROG 16V8-15, MEGABUFFER,	103885	PCB ASSY, MEGABUFFER, 1M RAM
104255	IC, PLD, PROG 16V8-15, MEGABUFFER,	103885	PCB ASSY, MEGABUFFER, 1M RAM
104256	IC, PLD, PROG 16V8-15, MEGABUFFER,	103885	PCB ASSY, MEGABUFFER, 1M RAM
104257	IC, PLD, PROG 20V8-15, MEGABUFFER,	103885	PCB ASSY, MEGABUFFER, 1M RAM
104258	SOCKET, IC, 20 PIN ZIP, AMP 2-38200	103885	PCB ASSY, MEGABUFFER, 1M RAM
104259	IC, 74F139	103885	PCB ASSY, MEGABUFFER, 1M RAM
104260	IC, 74F112	103885	PCB ASSY, MEGABUFFER, 1M RAM
104261	IC, 74F712-1	103885	PCB ASSY, MEGABUFFER, 1M RAM
104262	IC, RAM, DYNAMIC, IMX4, 20 PIN ZIP	103885	PCB ASSY, MEGABUFFER, 1M RAM
101051-05	LABOR, TEST	103885	PCB ASSY, MEGABUFFER, 1M RAM
103884	PCB, MEGABUFFER FOR 5000	103885	PCB ASSY, MEGABUFFER, 1M RAM
103255	SPACER, ROUND, 1/4 OD, #4, 1/2 LENG	103885	PCB ASSY, MEGABUFFER, 1M RAM

REV	ZONE	DESCRIPTION	REV DATE
1	B2	2077 ADDED NOTE 1 & 2	9-24-92
2	B3	2696: ADDED U1 AND U2	5-19-93





NOTES:

1. MARK BOARD WITH REV LEVEL, REV LEVEL TO REFLECT THIS DRAWING.

2. ADD SERIAL NO. IN LOCATION SHOWN USING PERMANENT BLACK INK.

AA BBBB CC DD EEE
- EEE: INDIVIDUAL BOARD NUMBER
- DD: WK OF YEAR OF ASSY
- CC: YR OF ASSY
- BBBB: PURCHASE ORDER NO.
- AA: VENDOR'S INITIALS

3. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.

CAUTION
SENSITIVE ELECTRONIC DEVICES
DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC, MAGNETIC OR RADIOACTIVE FIELDS

-	-	-	-	-	1	2	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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DRFT	CS	9-8-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103885S1	

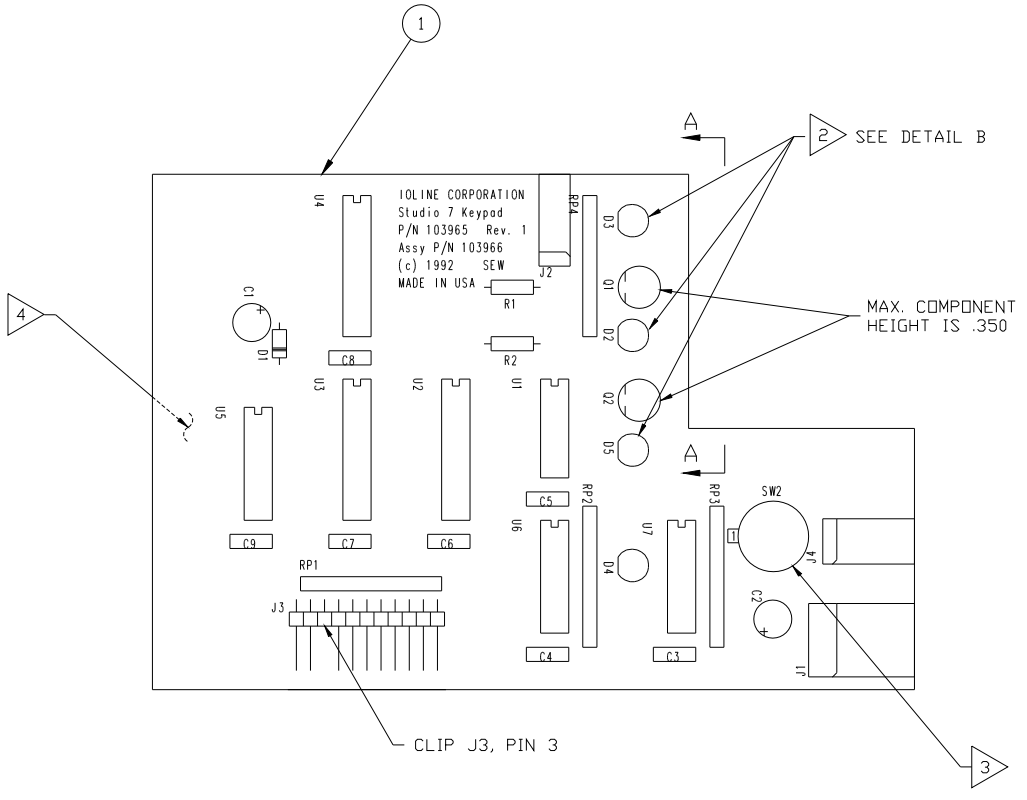
DRAWING NAME: PCB ASSY, MEGABUFFER, 1M RAM

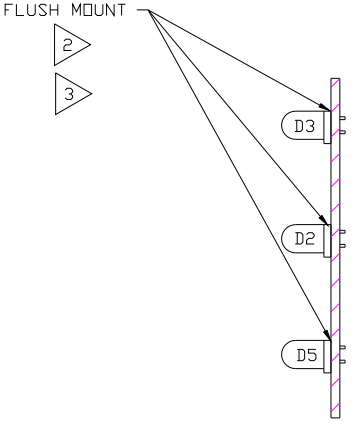
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
2	1 OF 2	103885

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
100343	RES, 2.2K OHM, 5%, 1/4W	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100357	CAP, CERAMIC, MONO, .1UF, 50V, .2 L	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100378	LED, RED	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100381	DIODE, 1N4148	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100393	IC, 74LS14	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100439	SOCKET, IC, 20 PIN DIP, .1 X .3	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
100901	LED, RED/GRN	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
101346	IC, 74LS574	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
101356	RES ARRAY, 4.7K OHM, SIP PU, 10 PIN	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
101357	RES ARRAY, 270 OHM, SIP PU, 10 PIN,	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102065	CONN, HDR, 10 PIN, 2 X 5 R-ANGLE M	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102441	CAP, TANT, 10UF, 15V, .1SP	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102457	IC, 74LS299	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102458	IC, 74LS165	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102465	TRANSISTOR, MPSA06, 80V, 500MA, TO-	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102636	CONN, HDR, 2 PIN, 1 X 2, .1 SP, RA	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
103963	SWITCH, 11 POS ROTARY, 1/8" SHAFT,	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
103965	PCB, KEYPAD, STUDIO 7	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
104002	IC, GAL, PROG, STUDIO 7 KEYPAD	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
104019	LED, GREEN	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
104021	CONN, HDR, 3 PIN, 1 X 3, .1 SP, RA	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
104022	CONN, HDR, 11 PIN, 1 X 3, .1 SP, RA	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
103935	ZIPLOCK BAG, STATIC, 6 X 8	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST
102064	RES ARRAY, 1K OHM, SIP PU, 10 PIN,	103966-01	PCB ASSY, KEYPAD, STUDIO 7, UNTEST

REV	ZONE	DESCRIPTION	REV DATE
1		INITIAL RELEASE REDESIGNED	4-9-92
3		2314 2387	7-28-92
4		2621 REPLACED RP1 WAS 101356 IS 102064	4-6-93
5		2816 ADDED REF DES D2 TO BOM	11-12-93





VIEW A-A

D2, D3, D5 SHOWN ONLY

NOTES:

1. MAX COMPONENT HEIGHT ABOVE PCB IS .350, WITH THE EXCEPTION OF SW2. LED BODY LENGTH IS ALLOWED TO EXCEED .350.

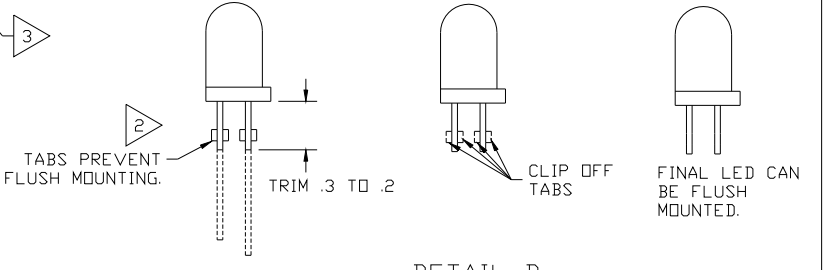
2. LEDS MUST BE FLUSH MOUNTED. LEDS THAT HAVE TABS ON THEIR LEADS MAY REQUIRE LEAD CLIPPING USING FLUSH CUTTERS, ONLY MODIFY LEDS THAT DO NOT SIT FLUSH ON BOARD. SEE DETAIL B.

3. SWITCH AND LEDS MUST BE PERPENDICULAR TO BOARD. HAND SOLDER IF NECESSARY.

4. ADD SERIAL NO. ON BACK SIDE OF BOARD IN LOCATION SHOWN USING PERMANENT BLACK INK.

```
AA BBBB CC DD EEE
|  |    |  |  |
|  |    |  |  └INDIVIDUAL BOARD NUMBER
|  |    |  └WK OF YEAR OF ASSY
|  |    └YR OF ASSY
|  └PURCHASE ORDER NO.
└VENDOR'S INITIALS
```

5. CAUTION: TO PREVENT DAMAGE TO ELECTROSTATIC SENSITIVE COMPONENTS, USE ANTI-STATIC PRECAUTIONS AND PLACE ASSEMBLED BOARD IN STATIC BAG.



DETAIL B

CAUTION

SENSITIVE ELECTRONIC DEVICES

DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC, MAGNETIC OR RADIOACTIVE FIELDS

-	-	-	-	-	4	5	REV
7	6	5	4	3	2	1	SHEET

REV STATUS OF SHEETS

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DRFT	CS	3-18-92
CHK		
ENGR		
MATL		
MFG		
QA		
MTKG		
File Name:	103966S1	

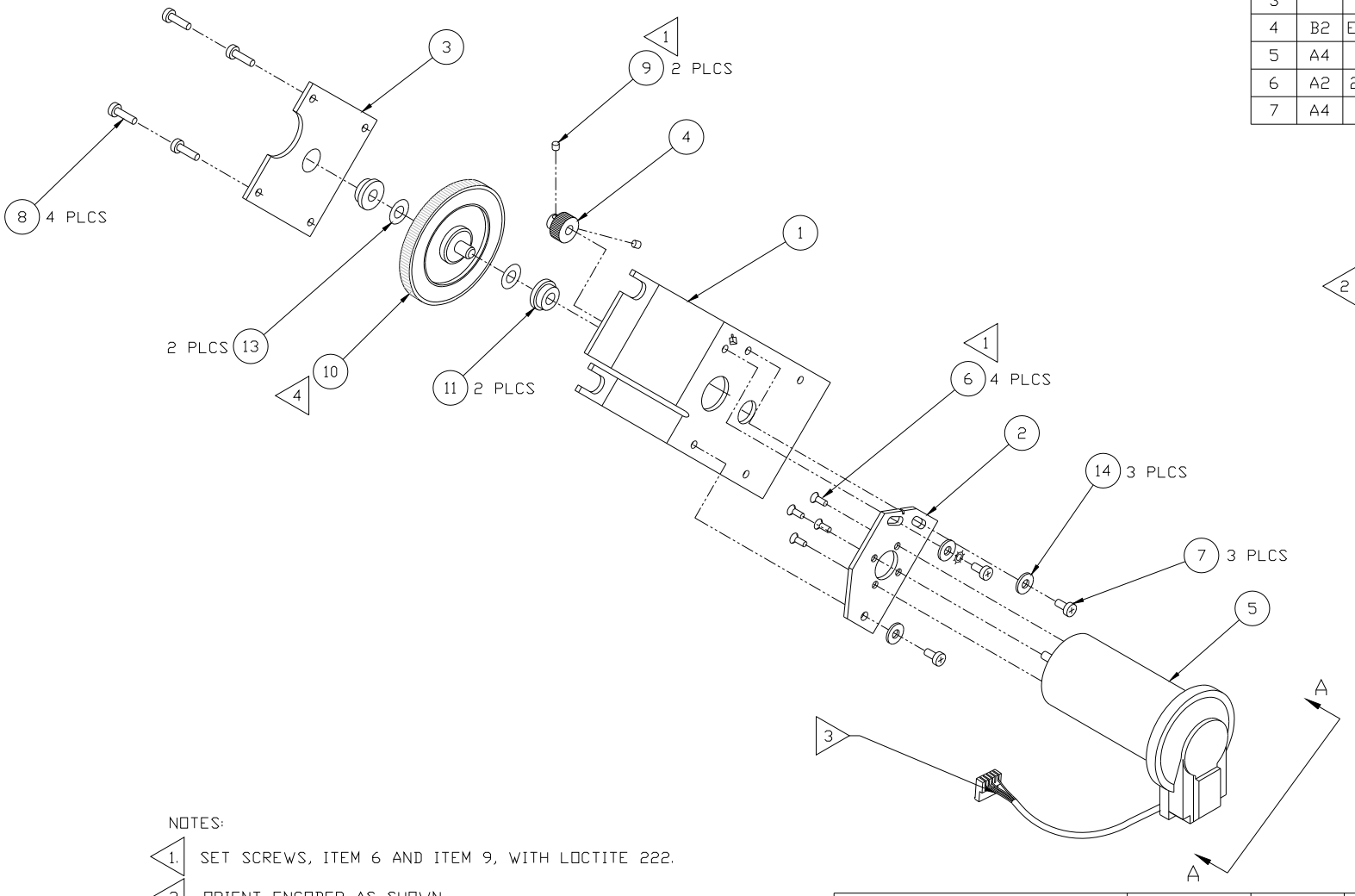
DRAWING NAME: PCB ASSY, KEYPAD, STUDIO 7

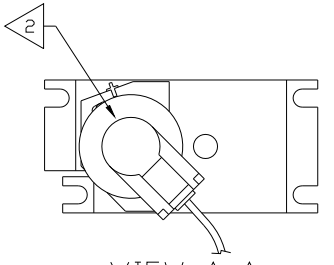
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
5	1 OF 2	103966

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103494	TRANS ASSY, X-DRIVE, 1000 CT
102902	BRACKET, TRANSMISSION, X-DRIVE	103494	TRANS ASSY, X-DRIVE, 1000 CT
102903	PLATE, MTG, MOTOR	103494	TRANS ASSY, X-DRIVE, 1000 CT
102904	PLATE, SUB, TRANSMISSION, X-DRIVE	103494	TRANS ASSY, X-DRIVE, 1000 CT
102910	GEAR, 33 TOOTH, 64 PITCH, 20 DEG	103494	TRANS ASSY, X-DRIVE, 1000 CT
103450	MOTOR, SERVO, 1000 CT ENCODER	103494	TRANS ASSY, X-DRIVE, 1000 CT
102939	GEAR ASSY, X-DRIVE, 165 TOOTH, 64	103494	TRANS ASSY, X-DRIVE, 1000 CT
102655	BEARING, FLANGE, .250ID, .500OD	103494	TRANS ASSY, X-DRIVE, 1000 CT
102737	SCREW #6-32, .25 LG, FHP	103494	TRANS ASSY, X-DRIVE, 1000 CT
104008	SCREW #8-32, .375 LG, PHP SEMS	103494	TRANS ASSY, X-DRIVE, 1000 CT
103908	SCREW #8-32, .50 LG, PHP SEMS	103494	TRANS ASSY, X-DRIVE, 1000 CT
102944	SCREW, #6-32 X .125 LG SH SET, CUP	103494	TRANS ASSY, X-DRIVE, 1000 CT
103551	WSHR, WAVE, .265 ID, .367 OD	103494	TRANS ASSY, X-DRIVE, 1000 CT
100091	WSHR, #8, FLAT, STEEL	103494	TRANS ASSY, X-DRIVE, 1000 CT

REV	ZONE	DESCRIPTION	REV DATE
3		ECO 1480 1504 2054	11-8-91
4	B2	ECO 2429: ADDED ITEM 14	9-14-92
5	A4	2491 ADDED NOTE 3	12-8-92
6	A2	2595 ITEM 7 WAS 100033	3-3-93
7	A4	3011: ADDED NOTE 4	7-7-94





VIEW A-A

NOTES:

1. SET SCREWS, ITEM 6 AND ITEM 9, WITH LOCTITE 222.
2. ORIENT ENCODER AS SHOWN.
3. PLACE LABEL ON CABLE READING "X ENCODER" AT APPROX. LOCATION INDICATED.
4. SET GEAR COMPRESSION PER ASSEMBLY PROCESS NOTES.

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DRFT	CS	4-11-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103494	

DRAWING NAME:
TRANSMISSION ASSY, X-DRIVE, 1000 CT

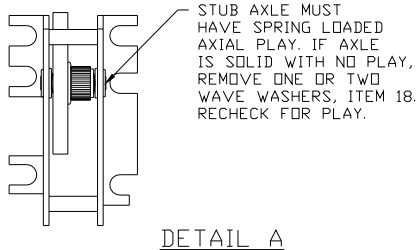
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
ANGLE = ± ° .XX = ±
.XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
7	1 OF 1	103494

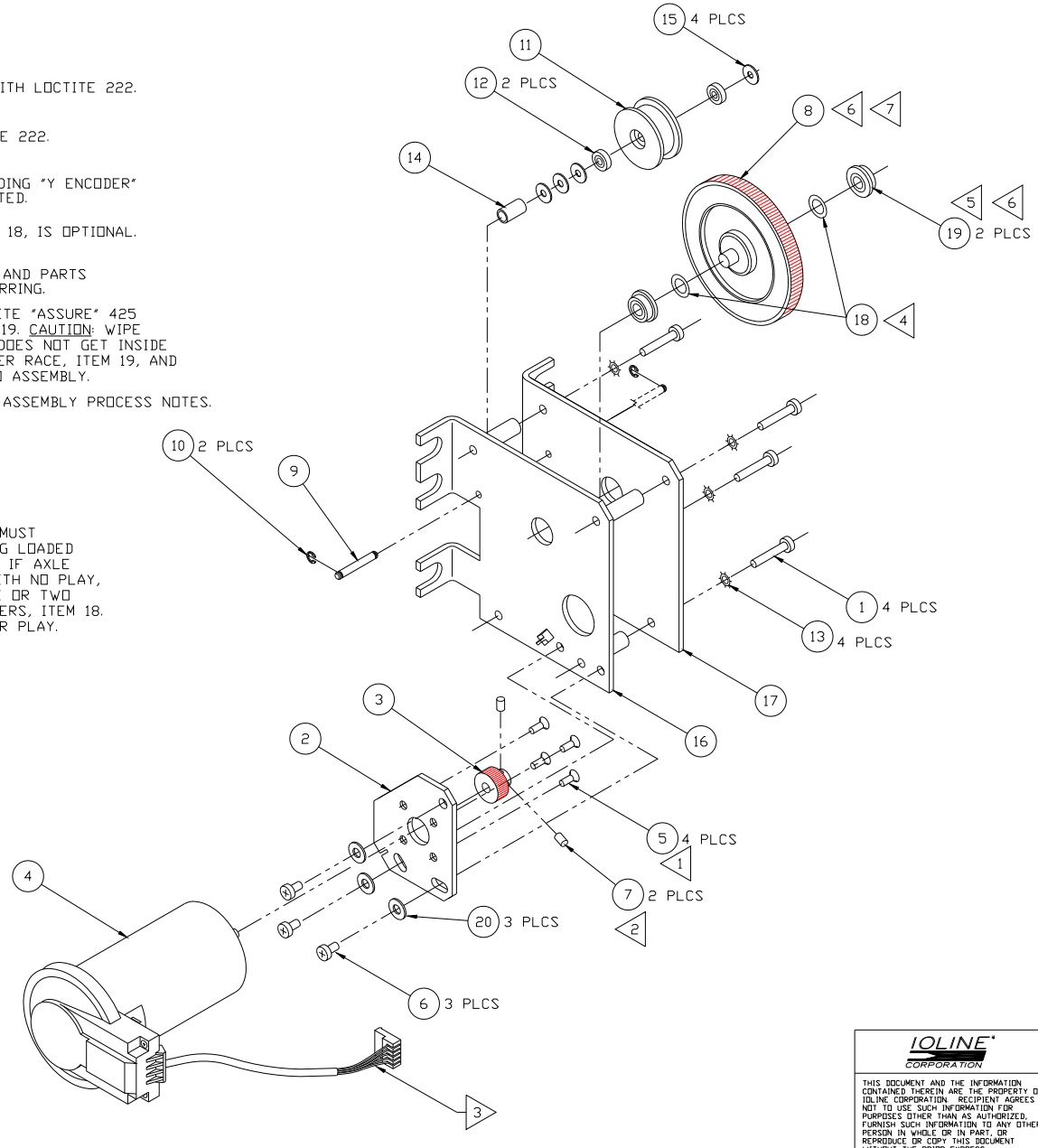
REV	ZONE	DESCRIPTION	REV DATE
2		ECO 1504 2159	3-6-92
3	A5	ECO 2428: ADDED ITEM 20.	9-22-92
4	A3	2491 ADDED NOTE 3	12-8-92
5	B8 C8	2521 ADDED DETAIL A ADDED NOTES 4 AND 5	2-2-93
6	A5	2595 ITEM 6 WAS 100033	3-3-93
7	A5	2616 ITEM 20 WAS 100091	3-23-93
8	C8	2884: ADDED NOTE 6, REVISED NOTE 5	4-8-94
9	C8	3011: ADDED NOTE 7	7-7-94

NOTES:

1. SECURE ITEM 5 TO ITEM 4 WITH LOCTITE 222.
2. SECURE ITEM 7 WITH LOCTITE 222.
3. PLACE LABEL ON CABLE READING "Y ENCODER" AT APPROX. LOCATION INDICATED.
4. SECOND WAVE WASHER, ITEM 18, IS OPTIONAL. SEE DETAIL A
5. DEBURRING IS NOT ALLOWED AND PARTS SHOULD ASSEMBLE W/O DEBURRING.
6. ADD SMALL AMOUNT OF LOCTITE "ASSURE" 425 TO BEARING INNER I.D., ITEM 19. CAUTION: WIPE OFF EXCESS LOCTITE SO IT DOES NOT GET INSIDE BEARING. CLEAN BEARING INNER RACE, ITEM 19, AND GEAR PINS, ITEM 8, PRIOR TO ASSEMBLY.
7. SET GEAR COMPRESSION PER ASSEMBLY PROCESS NOTES.


STUB AXLE MUST HAVE SPRING LOADED AXIAL PLAY. IF AXLE IS SOLID WITH NO PLAY, REMOVE ONE OR TWO WAVE WASHERS, ITEM 18. RECHECK FOR PLAY.

DETAIL A



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IOLINE CORPORATION

DRFT	JF	11-13-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103523	

DRAWING NAME: TRANSMISSION ASSY, Y-DRIVE, 1000 CT

UNLESS OTHERWISE SPECIFIED.
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± .XXX = ±
DO NOT SCALE DRAWING

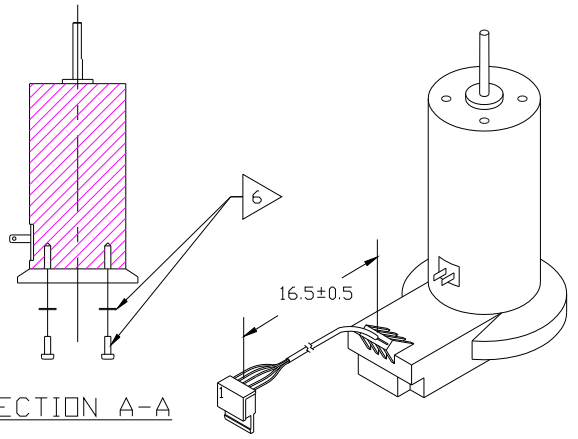
REV	Sheet No.	Drawing/Part No.
9	1 OF 1	103523

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102908	PLATE, MTG, MOTOR, Y-DRIVE	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102910	GEAR, 33 TOOTH, 64 PITCH, 20 DEG	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103450	MOTOR, SERVO, 1000 CT ENCODER	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103527	GEAR ASSY, Y-DRIVE, 165 TOOTH, 64 P	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103212	SHAFT, Y-AXIS DRIVE	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102344	PULLEY, IDLER	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102650	BEARING .375 X .125	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103528	BRACKET, TRANSMISSION, LOWER, Y-DR	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103529	BRACKET, TRANSMISSION, UPPER, Y-DR	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102655	BEARING, FLANGE, .250ID, .500OD	103523	TRANS ASSY, Y-DRIVE, 1000 CT
100044	SCREW #8-32, .75 PHP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102737	SCREW #6-32, .25 LG, FHP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
104008	SCREW #8-32, .375 LG, PHP SEMS	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102944	SCREW, #6-32 X .125 LG SH SET, CUP	103523	TRANS ASSY, Y-DRIVE, 1000 CT
102322	RING, RETAINING, E-CLIP, .125	103523	TRANS ASSY, Y-DRIVE, 1000 CT
100087	WSHR, #8, LOCK, EXT	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103401	SPACER, #6, .312 LG, NYLON	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103970	SPACER, PRECISION, 1/8"	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103551	WSHR, WAVE, .265 ID, .367 OD	103523	TRANS ASSY, Y-DRIVE, 1000 CT
103973	WSHR, .170 ID, .375 OD, .035TH, SS	103523	TRANS ASSY, Y-DRIVE, 1000 CT

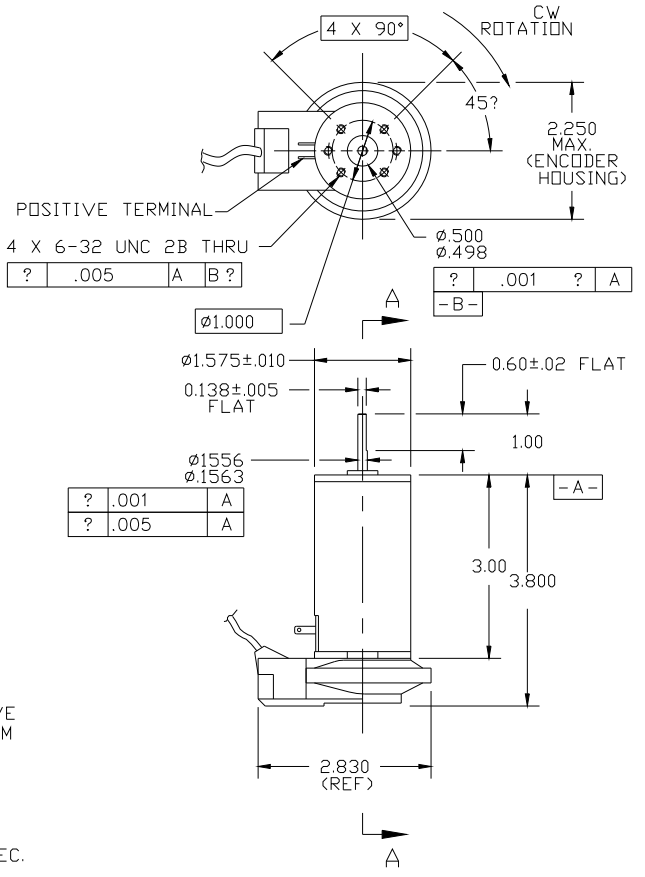
REV	ZONE	DESCRIPTION	REV DATE
2		1454 2354	6-23-92
3	B3 A3	2648: ø.1556 WAS ø.1563 ø.1563 WAS ø.1566	4-26-93
4	B4 A4	2771 ADDED SECTION A-A, ADDED NOTE 6	8-17-93

CONNECTOR AMP #640443-5		ENCODER MODULE HP HEDS-9000-B
1	BLK	GND
2	SHIELD	N.C. (THIS END ONLY)
3	WHT	CHANNEL A
4	RED	VCC
5	GRN	CHANNEL B

WIRING DIAGRAM



SECTION A-A



NOTES:

1. SHAFT ROTATION TO BE CLOCKWISE WITH POSITIVE VOLTAGE APPLIED TO "+" TERMINAL (VIEWED FROM MOTOR MOUNTING END).
2. SHAFT END PLAY TO BE .015 MAX. WITH 5 LBS. FORCE APPLIED IN DIRECTION SHOWN.
3. MOTOR MUST WITHSTAND 500 VAC HI-POT FOR 1 SEC. WITH LESS THAN 10 MA FAULT CURRENT.
4. SHAFT MUST RETURN TO WITHIN .0005 OF ITS ORIGINAL POSITION AFTER END PLAY TEST.
5. MOTOR TERMINALS TO MATE WITH AMP 110 SERIES FASTON CONNECTORS (.020 THK. TAB) OR EQUIVALENT.
6. ENCODER HOUSING SCREWS MUST BE LOCKED IN PLACE USING SMALL FASTENER LOCTITE. FASTENERS HOLDING ENCODER HOUSING TO MOTOR MUST HAVE FLAT WASHERS AND THEY ARE TO BE TIGHTENED TO 3 INCH-POUNDS (SEE SECTION A-A).

MOTOR PERFORMANCE DATA			
PARAMETERS	SYMBOL	UNIT	VALUE
RATED VOLTAGE	V	VOLTS	13.5
STALL CURRENT	Is	AMPS	15.4
BACK EMF CONSTANT	Ke	V/KRPM	2.13
TORQUE CONSTANT	Kt	IN.OZ/A	2.88
NO LOAD SPEED	Wnl	RPM	6195
NO LOAD CURRENT	Inl	AMPS	.35
FRICTION TORQUE (STATIC)	Tf	IN. OZ.	1
STALL TORQUE	Ts	IN. OZ.	43
TERMINAL RESISTANCE	Rt	OHMS	.88
TERMINAL INDUCTANCE	L	MH	.95
AMMATURE INERT	J	MOISS	
THERMAL IMPEDANCE	Rth	C°/WAT	
THERMAL TIME CONSTANT	Tth	MIN.	
MAX. WINDING TEMP.		C°	
MOTOR WEIGHT		OZ.	

ENCODER SPECIFICATION	
DESCRIPTION	PART NO.
HEWLETT PACKARD ENCODER	
MODULE	HEDS-9000-B (1000CT)
HEWLETT PACKARD ENCODER	
DISK, OR EQUIVALENT	HEDS-6100-B (1000CT)
HANSEN MFG. ENCODER	
HOUSING	1000CT-TYPE

WIRE SPECIFICATION	
DESCRIPTION	PART NO.
CABLE, SHIELDED, 4 COND.,	
24 GA.	BELDEN P/N 9534

CONNECTOR SPECIFICATION	
DESCRIPTION	PART NO.
AMP CONNECTOR	640443-5
AMP CONNECTOR COVER	643075-5

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DRFT	JF	9-21-90
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	103450	

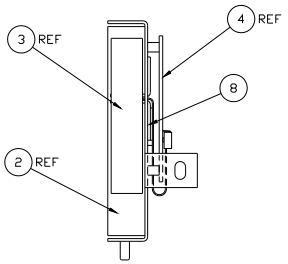
DRAWING NAME: MOTOR, SERVO, 1000CT ENCODER,SIGNATURE 5000

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .01
ANGLE = ± 1° .XXX = ± .005
DO NOT SCALE DRAWING

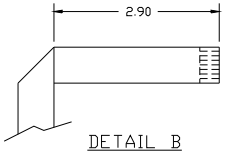
REV	Sheet No.	Drawing/Part No.
4	1 OF 1	103450

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104481	CARTRIDGE ASSY, METAL
103571	COVER, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
103572	CARTRIDGE, BODY	104481	CARTRIDGE ASSY, METAL
102410	FLEX CABLE, 12 COND	104481	CARTRIDGE ASSY, METAL
102884	PCB ASSY, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
101376	TAPE, FOAM DOUBLE COAT, .5 IN	104481	CARTRIDGE ASSY, METAL
105562	PROTECTOR, PIN, CARTRIDGE	104481	CARTRIDGE ASSY, METAL
104337	SCREW #4-40, .375 PHP, SEMS	104481	CARTRIDGE ASSY, METAL
104007	SCREW #8-32, .312 LG, PHP SEMS	104481	CARTRIDGE ASSY, METAL
104013	NUT, #8-32, KEP	104481	CARTRIDGE ASSY, METAL

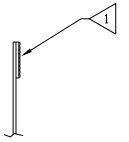
REV	ZONE	DESCRIPTION	REV DATE
1	A2 A2	2686 15 COILS WAS 14 ADDED NOTE 4 & DETAIL	5-18-93
2		3328 ADD NOTE 5, ADD 105562 PIN PROTECTOR	11-14-95

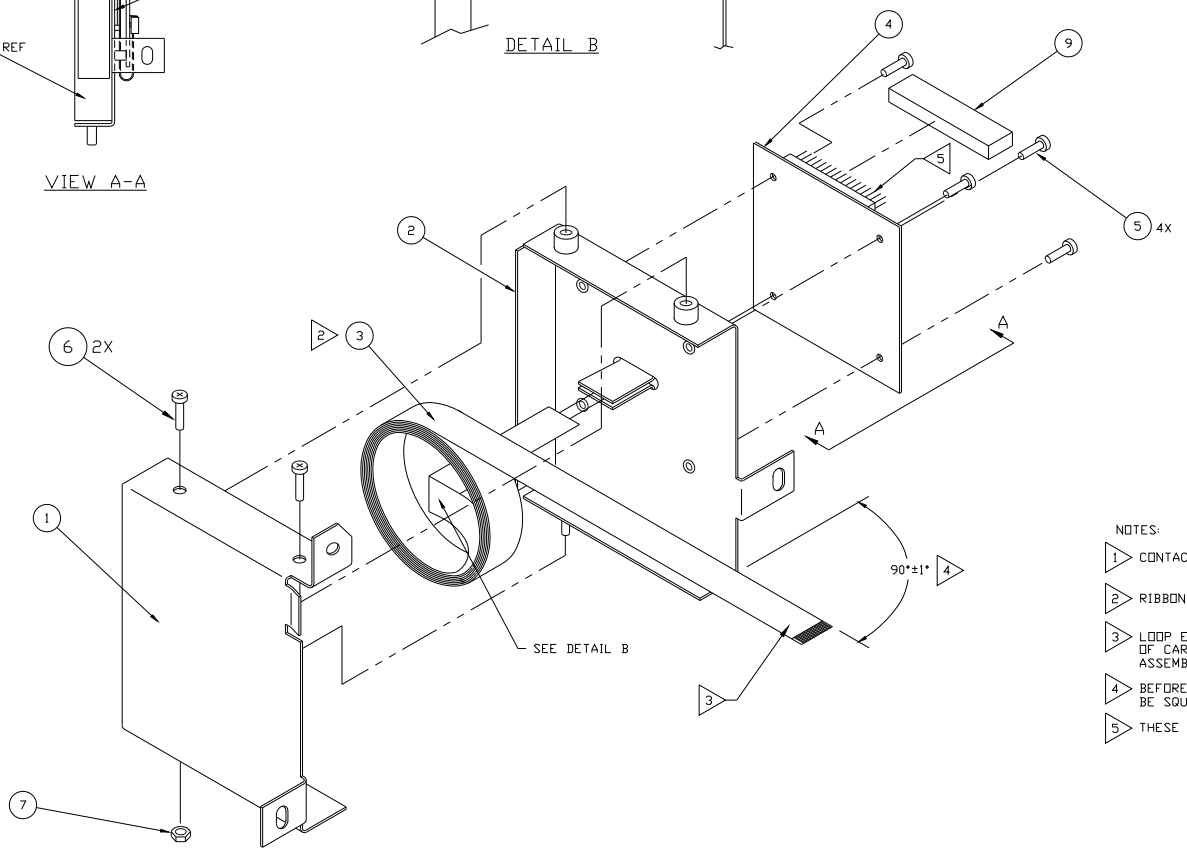


VIEW A-A



DETAIL B





NOTES:

1. CONTACTS MUST FACE DOWN, AS SHOWN IN DETAIL B.
2. RIBBON CABLE MUST HAVE 15 COILS (WRAPS).
3. LOOP END OF CABLE AROUND AND TAPE TO OUTSIDE OF CARTRIDGE SO THAT CABLE WILL NOT RECOIL AFTER ASSEMBLY. DO NOT TAPE OVER EXPOSED CONTACTS.
4. BEFORE WRAPPING COILS, RIBBON CABLE, ITEM 7, MUST BE SQUARE WITH CARTRIDGE BODY, ITEM 5, ±1°.
5. THESE PINS NEED TO BE PROTECTED DURING HANDLING.

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DRFT	TCS	2-11-93
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LB	File Name: 104481	

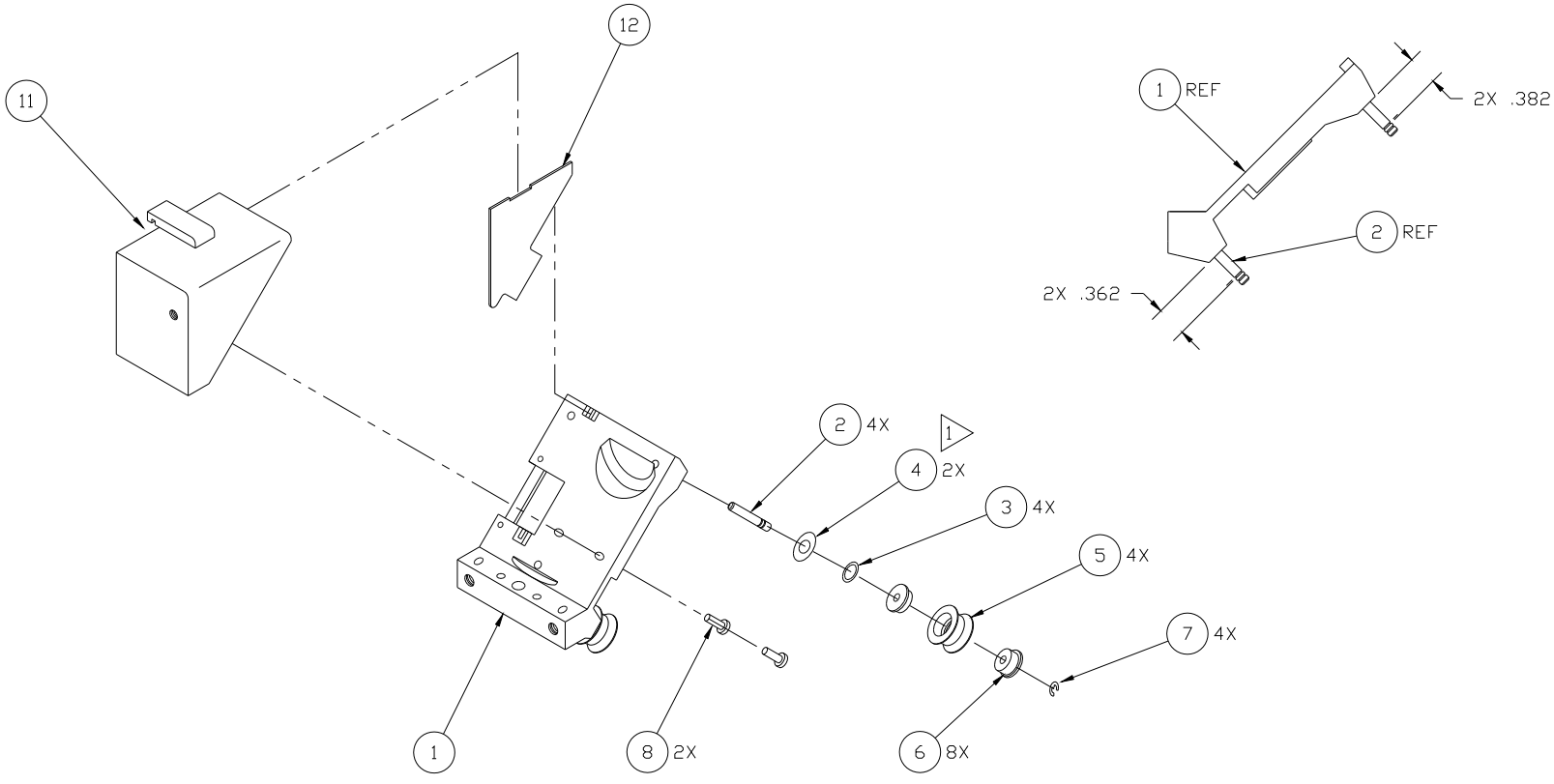
DRAWING NAME: CARTRIDGE ASSY, METAL

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .XX = ± .10
ANGLE = ± 1° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
2	1 OF 1	104481

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104047	CARRIAGE ASSY, STUDIO 7
102329	FRAME, CARRIAGE	104047	CARRIAGE ASSY, STUDIO 7
102991	SHAFT, WHEEL	104047	CARRIAGE ASSY, STUDIO 7
103828	WHEEL, CARRIAGE	104047	CARRIAGE ASSY, STUDIO 7
103221	BEARING, RADIAL FLANGE, .125ID, .3	104047	CARRIAGE ASSY, STUDIO 7
104056	BLOCK, CARRIAGE	104047	CARRIAGE ASSY, STUDIO 7
104501	PCB ASSY, CARRIAGE	104047	CARRIAGE ASSY, STUDIO 7
102976	SCREW #4-24, .312 LG, PHP, BLUNT PO	104047	CARRIAGE ASSY, STUDIO 7
102620	WAVE WASHER	104047	CARRIAGE ASSY, STUDIO 7
103659	WSHR, .125ID, .020TH, FLAT, NYLON	104047	CARRIAGE ASSY, STUDIO 7
102322	RING, RETAINING, E-CLIP, .125	104047	CARRIAGE ASSY, STUDIO 7
102989	SCREW #4-24, .50 LG, PHP, SELF TAP,	104047	CARRIAGE ASSY, STUDIO 7

REV	ZONE	DESCRIPTION	REV DATE
1	B3	2620 ITEM 12 WAS 104065 REMOVED 102330 CLAMP	6-7-93



1 INSTALL PLASTIC WASHER, ITEM 4, TWO PLACES ONLY, ONE ON EACH OF THE UPPER SHAFTS.

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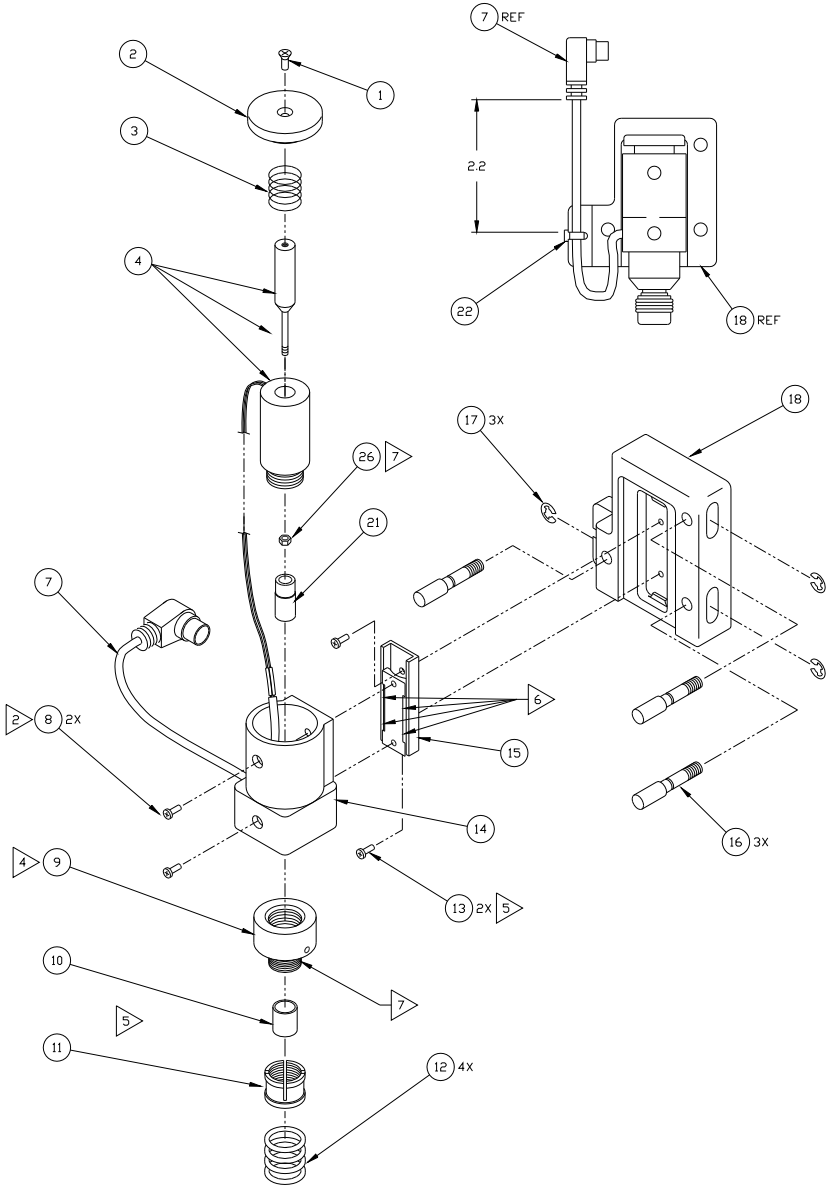
DRFT	TCS	1-24-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	104047	

DRAWING NAME: CARRIAGE ASSY, STUDIO 7

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 1° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
1	1 OF 1	104047

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104050	CUTTER ASSY, STUDIO 7
104042	CAP, CUTTER	104050	CUTTER ASSY, STUDIO 7
104057	SPRING, COMPRESSION	104050	CUTTER ASSY, STUDIO 7
104059	SOLENOID, CUTTER	104050	CUTTER ASSY, STUDIO 7
102850	CABLE ASSY, 90 DEG MINI DIN, STRN R	104050	CUTTER ASSY, STUDIO 7
104058	NOSE, CUTTER	104050	CUTTER ASSY, STUDIO 7
104016	BEARING, DU, .312 ID, .500 LG	104050	CUTTER ASSY, STUDIO 7
104041	FOOT, CUTTER	104050	CUTTER ASSY, STUDIO 7
103655	O-RING, .426 ID X .070	104050	CUTTER ASSY, STUDIO 7
104307	HOUSING, CUTTER	104050	CUTTER ASSY, STUDIO 7
104017	LINEAR SLIDE, BALL BEARING	104050	CUTTER ASSY, STUDIO 7
104103	THUMBSCREW	104050	CUTTER ASSY, STUDIO 7
103852	RING, RETAINING, E-CLIP, 3/16	104050	CUTTER ASSY, STUDIO 7
104053	BLOCK, MOUNTING	104050	CUTTER ASSY, STUDIO 7
103090	BOOT, CABLE	104050	CUTTER ASSY, STUDIO 7
102974	HEATSHRINK, .093 DIA, CLEAR	104050	CUTTER ASSY, STUDIO 7
104051	SHAFT ASSY, CUTTER	104050	CUTTER ASSY, STUDIO 7
103408	SCREW #4-40, .50 LG FHP, BLK	104050	CUTTER ASSY, STUDIO 7
104605	SCREW #4-40, .625 LG, W/LOCK	104050	CUTTER ASSY, STUDIO 7
104132	SCREW #4-40, .156 LG, SET, NYLON TI	104050	CUTTER ASSY, STUDIO 7
104010	SCREW M3, 4 MM LG	104050	CUTTER ASSY, STUDIO 7
104559	SCREW #2-56, .3125 LG, FHP	104050	CUTTER ASSY, STUDIO 7
104992	SCREW, #2-56 X .4375 LG, FHP	104050	CUTTER ASSY, STUDIO 7
103726	TYRAP, .1 IN X 3 IN, BLACK	104050	CUTTER ASSY, STUDIO 7
104962	NUT, M2.5 X 0.45, HEX	104050	CUTTER ASSY, STUDIO 7



REV	ZONE	DESCRIPTION	REV DATE
1		ECO 2318	6-3-92
2		ECO 2347	6-15-92
3	B7	CHANGED HOUSING, #14 ECO 2472	1-14-93
5	A3 D2	2480 ADDED CLEANING TO NOTES 4 AND 5, 2541 2.5 WAS 1.8	2-9-93
6	B6	2629 SCREW ITEM 13 WAS 102736 IS 104559	4-6-93
7	A6	2714 O-RING, ITEM 12 WAS 100126	6-9-93
8	B7 C7	2718 ADDED PARTS FROM SHAFT ASSY (104051) ITEMS 5, 22-25	6-29-93
9	C7 C7	2765: ITEM 5 WAS 104044, ADDED ITEM 26, DELETED 104132	8-10-93
10	D7	2784 REPLACED SCREW 103408 WITH 104605	9-1-93
11		2871 REMOVE P/N 104595, 103037, 104316, 104317, 103035; ADD 104051	4-8-94
12		R/C REMOVE DETAIL A PER ECO 2871	6-1-94
12	B3	2942 CHG NOTE 5 AND ADD NOTE 7	6-1-94
13	C4	3632 ADD ALTERNATE WIRE INSULATION COLORS	8-1-96
14		3671 DEL 103090 BOOT	9-23-96
15	B6	3816 104992 WAS 104559 SCREW	3-5-97

NOTES:

2. SECURE ITEMS 8 AND 15 WITH LOCTITE 222.
3. WITH SOLENOID PLUNGER FULLY SEATED, ADJUST PLUG, ITEM 5, TO DIMENSION SHOWN. PLUG MUST PIVOT FREELY ON SOLENOID PLUNGER.
4. CLEAN WITH SAFETY SOLVENT 755 OR ALCOHOL TO REMOVE OIL AND CONTAMINANTS. SECURE ITEMS 4 AND 9 WITH LOCTITE "ASSURE" 425.
5. SECURE ITEMS TOGETHER WITH BLACK MAX 380 (2-3 MIN FIXTURE), LOCTITE "ASSURE" 425 (30 SEC.), OR LOCTITE 262 W/PRIMER N (2-3 MIN.).
6. APPLY BEACON 325 BEARING GREASE TO FULL LENGTH OF BOTH INNER RACES.
7. SECURE ITEMS 4, 26, AND 5 TOGETHER USING LOCTITE 272 W/PRIMER N. CLEAN MATING PARTS THOROUGHLY WITH ALCOHOL AND ALLOW TO DRY. (SEE ASSEMBLY PROCESS NOTES).

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DRFT	TCS	2-11-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	104050	

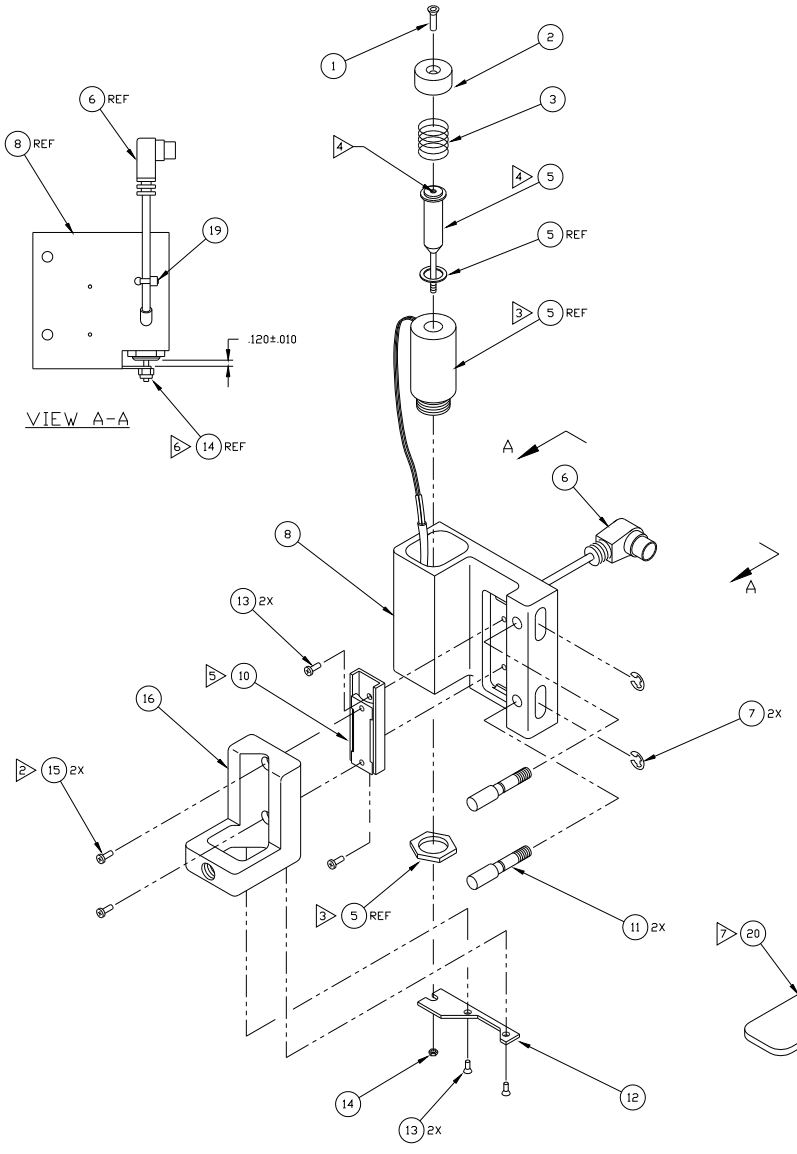
DRAWING NAME: CUTTER ASSY, STUDIO 7

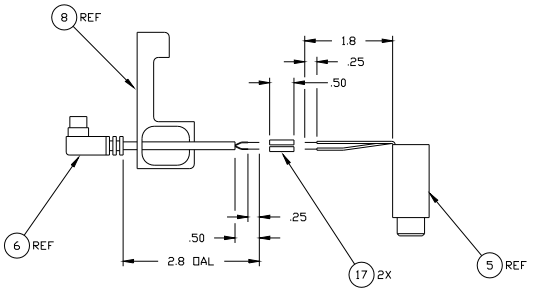
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
ANGLE = ± 1° .XX = ± .06
.XXX = ± .010
DO NOT SCALE DRAWING

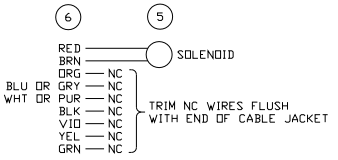
REV	Sheet No.	Drawing/Part No.
15	1 OF 1	104050

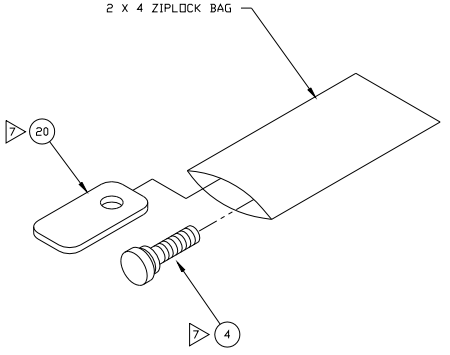
COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	104238	PEN HOLDER ASSY
103408	SCREW #4-40, .50 LG FHP, BLK	104238	PEN HOLDER ASSY
104650	COVER, UNWINDER	104238	PEN HOLDER ASSY
104605	SCREW #4-40, .625 LG, W/LOCK	104238	PEN HOLDER ASSY
104243	CAP, PEN SOLENOID	104238	PEN HOLDER ASSY
104057	SPRING, COMPRESSION	104238	PEN HOLDER ASSY
104059	SOLENOID, CUTTER	104238	PEN HOLDER ASSY
102850	CABLE ASSY, 90 DEG MINI DIN, STRN R	104238	PEN HOLDER ASSY
104244	BLOCK, PEN HOLDER	104238	PEN HOLDER ASSY
104017	LINEAR SLIDE, BALL BEARING	104238	PEN HOLDER ASSY
104103	THUMBSCREW	104238	PEN HOLDER ASSY
104245	PLATE, ACTUATOR	104238	PEN HOLDER ASSY
104246	CLAMP, PEN HOLDER	104238	PEN HOLDER ASSY
103090	BOOT, CABLE	104238	PEN HOLDER ASSY
104247	GAUGE, PEN HEIGHT	104238	PEN HOLDER ASSY
104135	SCREW 5/16-18, 1.0 LG, THUMB	104238	PEN HOLDER ASSY
103852	RING, RETAINING, E-CLIP, 3/16	104238	PEN HOLDER ASSY
104559	SCREW #2-56, .3125 LG, FHP	104238	PEN HOLDER ASSY
104241	NUT, M2.5 X 0.45, HEX NYLOCK	104238	PEN HOLDER ASSY
104010	SCREW M3, 4 MM LG	104238	PEN HOLDER ASSY
102974	HEATSHRINK, .093 DIA, CLEAR	104238	PEN HOLDER ASSY
103726	TYRAP, .1 IN X 3 IN, BLACK	104238	PEN HOLDER ASSY

REV	ZONE	DESCRIPTION	REV DATE
1	A3 A3	NOTE 3, 242 WAS 222 REVISED NOTE 4 ECO 2480	1-13-93
2	A6	2629 SCREW ITEM 13 WAS 102736 IS 104559	4-7-93
3	A4 A5	2715 ADDED 2 X 4 ZIPLOCK AND PEN HEIGHT GAUGE	6-10-93
4	D6	2784 REPLACED SCREW 103408 WITH 104605	9-1-93
5	D6	3294 REPLACED SCREW 103408 WITH 104605 (REPEAT OF ECO 2784)	4-21-95
6		3632 ADD ALTERNATE WIRE INSULATION COLORS	8-1-96
7	D3	3671 DEL 103090 BOOT	9-23-96









NOTES:

2 SECURE ITEMS 15 AND 10 WITH LOCTITE 222.

3 SECURE NUT AND SOLENOID, ITEM 5, WITH LOCTITE 242.

4 CLEAN WITH SAFETY SOLVENT 755 TO REMOVE OIL AND CONTAMINANTS. SECURE ITEMS 1 AND 4 WITH LOCTITE 242.

5 APPLY BEACON 325 BEARING GREASE TO FULL LENGTH OF BOTH INNER RACES.

6 WITH SOLENOID FULLY SEATED, ADJUST NUT, ITEM 14, TO SET GAP BETWEEN END OF SOLENOID AND ACTUATOR PLATE, ITEM 12, AS SHOWN.

8 PLACE THUMBSCREW, ITEM 4, AND GAUGE, ITEM 20, INTO 2 X 4 ZIPLOCK BAG.

9 PLACE COMPLETED PEN HOLDER ASSY AND 2 X 4 ZIPLOCK BAG IN 5 X 8 ZIPLOCK BAG (NOT SHOWN).

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DRFT	TCS	8-10-92
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		

LB File Name: 104238

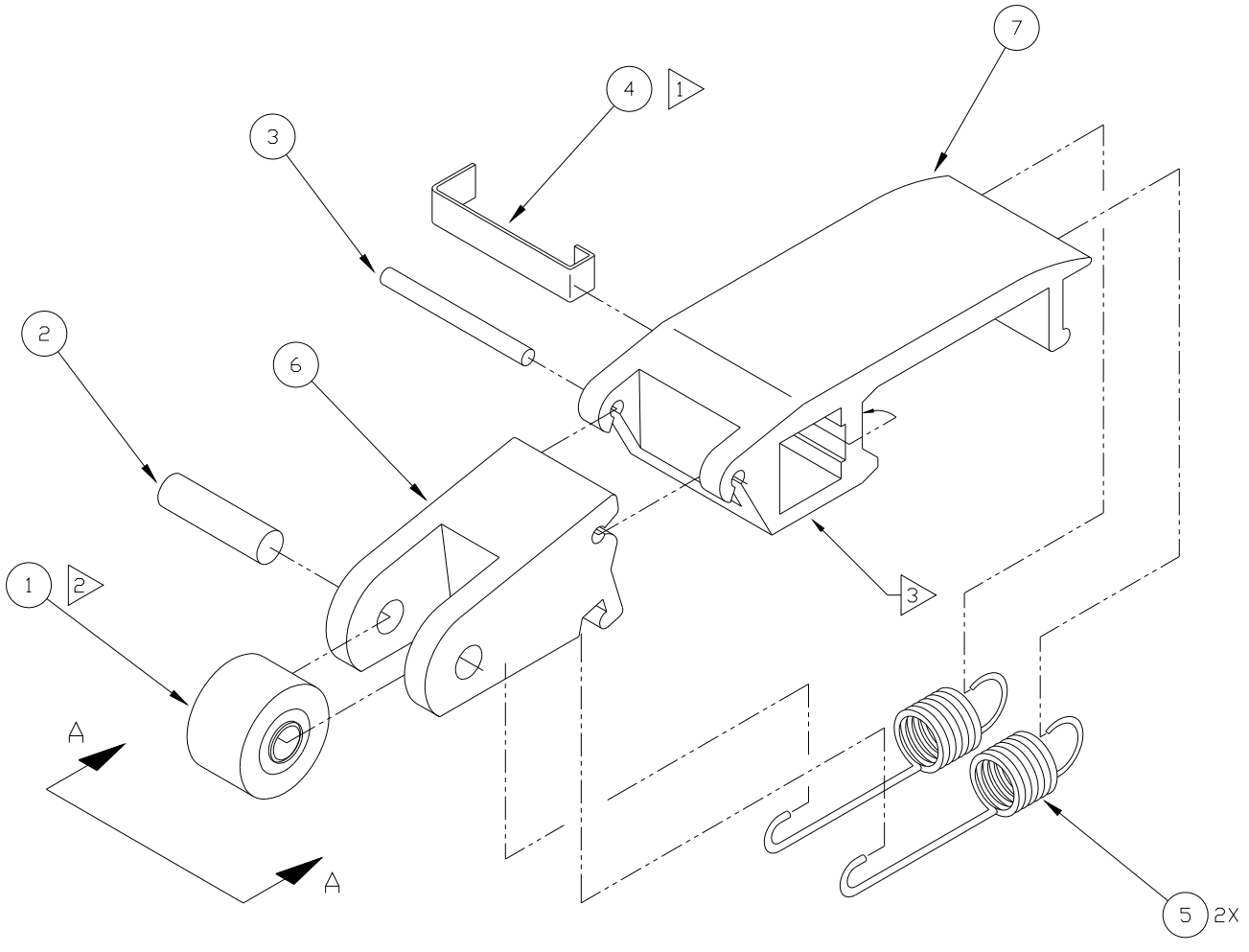
DRAWING NAME: PEN HOLDER ASSY

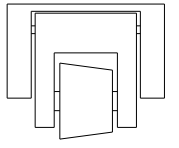
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .06
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
7	1 OF 1	104238

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
100943	WHEEL, IDLER ARM	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101004	AXLE, IDLER ARM WHEEL	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101861	PIN, IDLER ARM	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101862	SPRING, SLIDE, CHART WHEEL	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101863	SPRING, TENSION, CHART WHEEL, 4#	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101866	ARM, IDLER, ALUM EXTRUSION, ANODIZE	101864	CHART WHEEL ASSY, LEFT, TWO SPRING
101867	ARM IDLER, LIFTER, ALUM EXTRUSION,	101864	CHART WHEEL ASSY, LEFT, TWO SPRING

REV	ZONE	DESCRIPTION	REV DATE
1	B3	2627 CORRECTED VIEW OF ITEM 4	3-31-93
2	C2	3204: MOVED LABEL, NOTE 3	2-13-95
3	B2	3941 UPDATE IDLER ARM VIEW	8-8-97





VIEW A-A

NOTES:

1. INSERT THRU SQUARE HOLE THEN CRIMP IN PLACE.
2. BEVEL TO LEFT AS IN VIEW A-A.
3. LABEL "L" WITH PERMANENT INDELIBLE FELT TIP MARKER.

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DRFT	BLF	7-18-89
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LP	File Name: 101864	

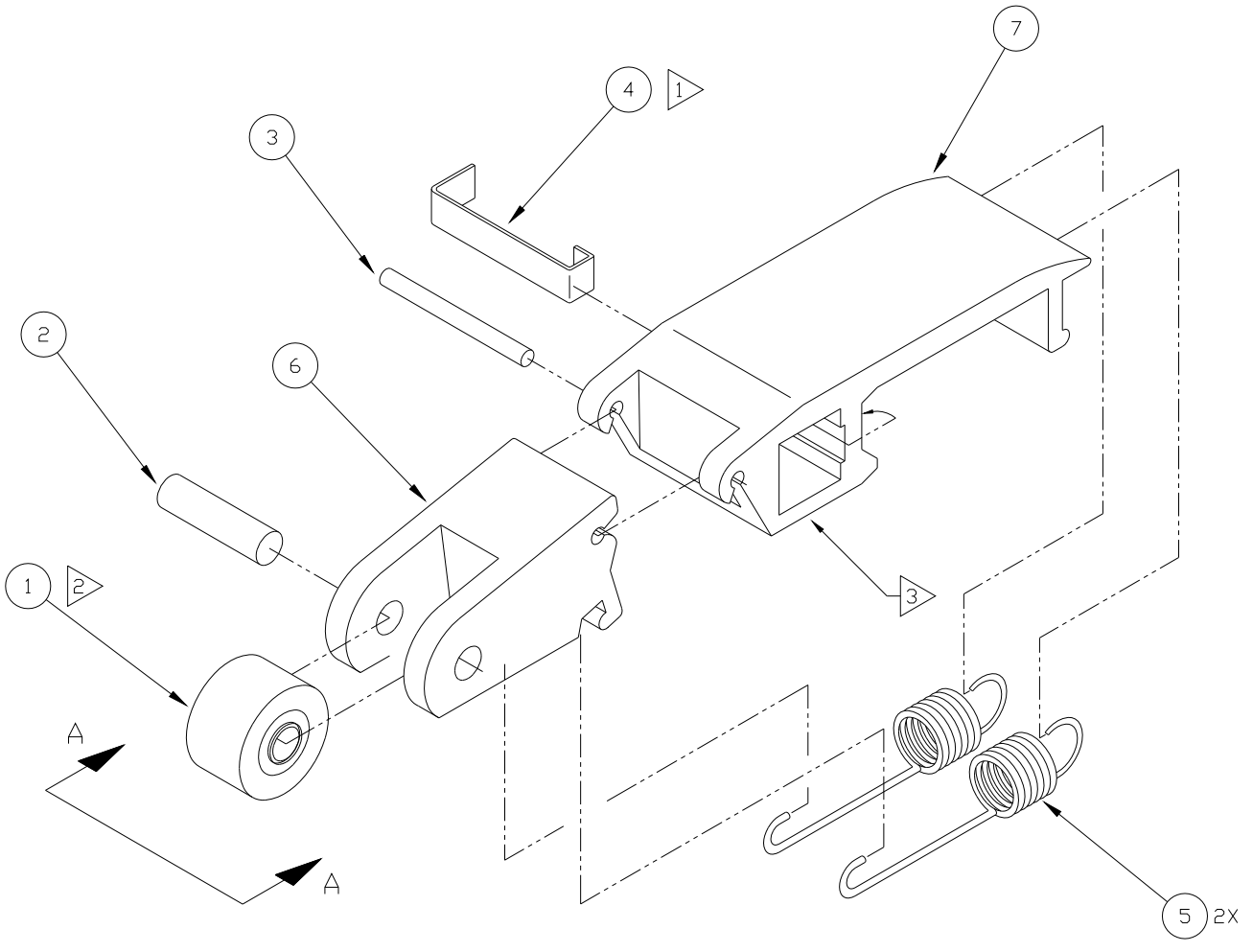
DRAWING NAME: CHART WHEEL ASSY, LEFT, TWO SPRING

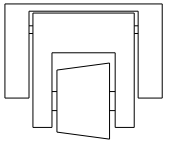
UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
ANGLE = ± 2° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
3	1 OF 1	101864

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
100943	WHEEL, IDLER ARM	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101004	AXLE, IDLER ARM WHEEL	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101861	PIN, IDLER ARM	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101862	SPRING, SLIDE, CHART WHEEL	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101863	SPRING, TENSION, CHART WHEEL, 4#	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101866	ARM, IDLER, ALUM EXTRUSION, ANODIZE	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING
101867	ARM IDLER, LIFTER, ALUM EXTRUSION,	101865	CHART WHEEL ASSY, RIGHT, TWO SPRING

REV	ZONE	DESCRIPTION	REV DATE
1	B3	2627 CORRECTED VIEW OF ITEM 4	3-31-93
2	C2	3204: MOVED LABEL, NOTE 3	2-13-95
3	B2	3941 UPDATE IDLER ARM VIEW	8-8-97





VIEW A-A

NOTES:

1. INSERT THRU SQUARE HOLE THEN CRIMP IN PLACE.
2. BEVEL TO RIGHT AS IN VIEW A-A.
3. LABEL "R" WITH PERMANENT INDELIBLE FELT TIP MARKER.

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DRFT	BLF	7-18-89
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
LP	File Name:	101865

DRAWING NAME: CHART WHEEL ASSY, RIGHT, TWO SPRING

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ANGLE = ± 2° .XX = ± .03
.XXX = ± .010
DO NOT SCALE DRAWING

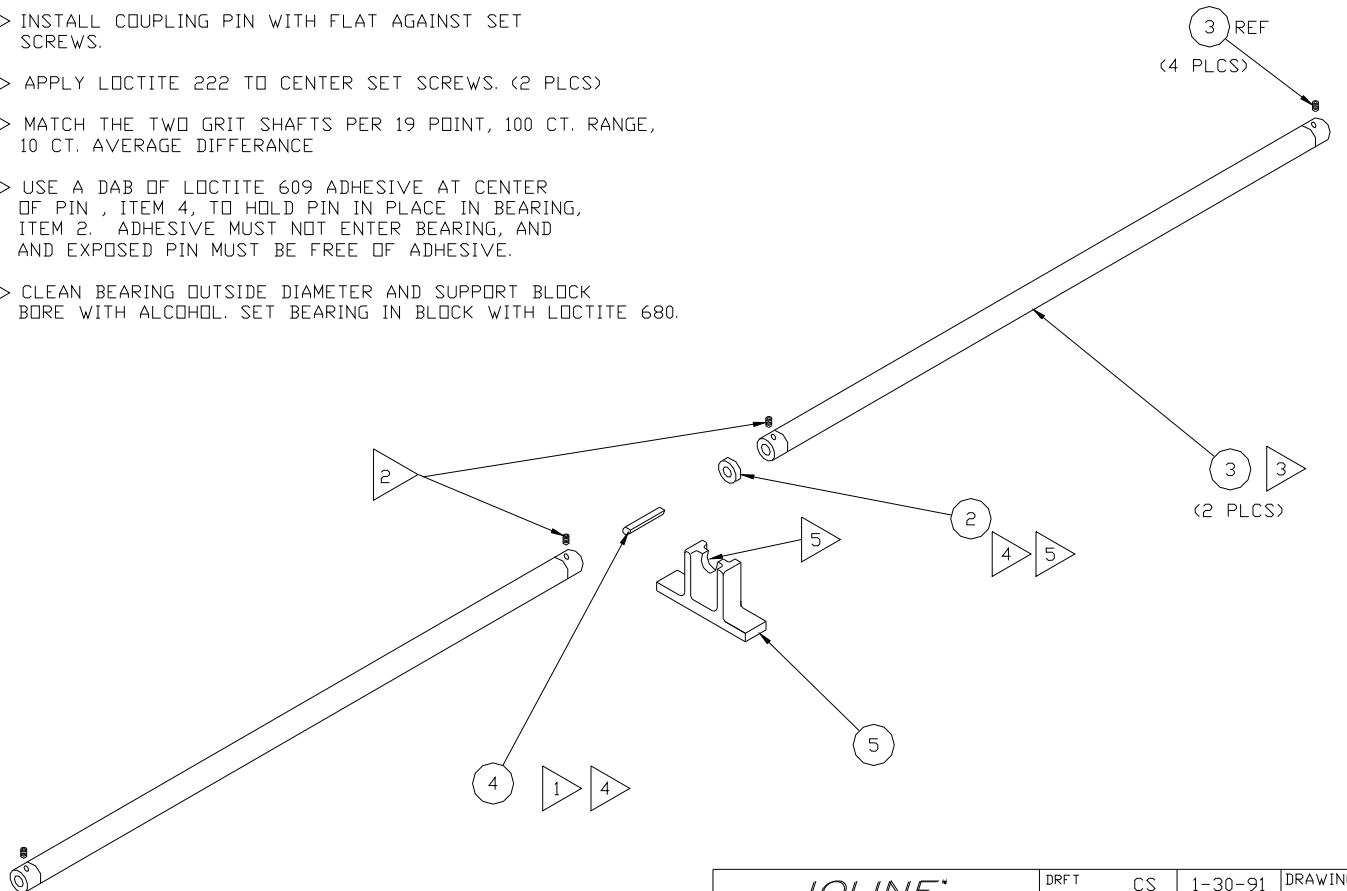
REV	Sheet No.	Drawing/Part No.
3	1 OF 1	101865

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-03	LABOR, MACHINE SHOP	102419	GRIT SHAFT ASSY, X AXIS DRIVE
101051-04	LABOR, GRITSHAFT	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100316	BEARING, BALL, .25ID, .625OD, .196	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100550	SHAFT, X-AXIS DRIVE FINISHED	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100551	PIN, .249 DIA, 1.20 LG	102419	GRIT SHAFT ASSY, X AXIS DRIVE
100552	SUPPORT BLOCK, X-AXIS	102419	GRIT SHAFT ASSY, X AXIS DRIVE

REV	ZONE	DESCRIPTION	REV DATE
5		1511 2251	4-3-92
6	B4	2488 CHG NOTES 3 & 5	12-3-92

NOTES:

1. INSTALL COUPLING PIN WITH FLAT AGAINST SET SCREWS.
2. APPLY LOCTITE 222 TO CENTER SET SCREWS. (2 PLCS)
3. MATCH THE TWO GRIT SHAFTS PER 19 POINT, 100 CT. RANGE, 10 CT. AVERAGE DIFFERANCE
4. USE A DAB OF LOCTITE 609 ADHESIVE AT CENTER OF PIN , ITEM 4, TO HOLD PIN IN PLACE IN BEARING, ITEM 2. ADHESIVE MUST NOT ENTER BEARING, AND AND EXPOSED PIN MUST BE FREE OF ADHESIVE.
5. CLEAN BEARING OUTSIDE DIAMETER AND SUPPORT BLOCK BORE WITH ALCOHOL. SET BEARING IN BLOCK WITH LOCTITE 680.



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DRFT	CS	1-30-91
CHK		
ENGR		
MATL		
MFG		
QA		
MKTG		
File Name:	102419	

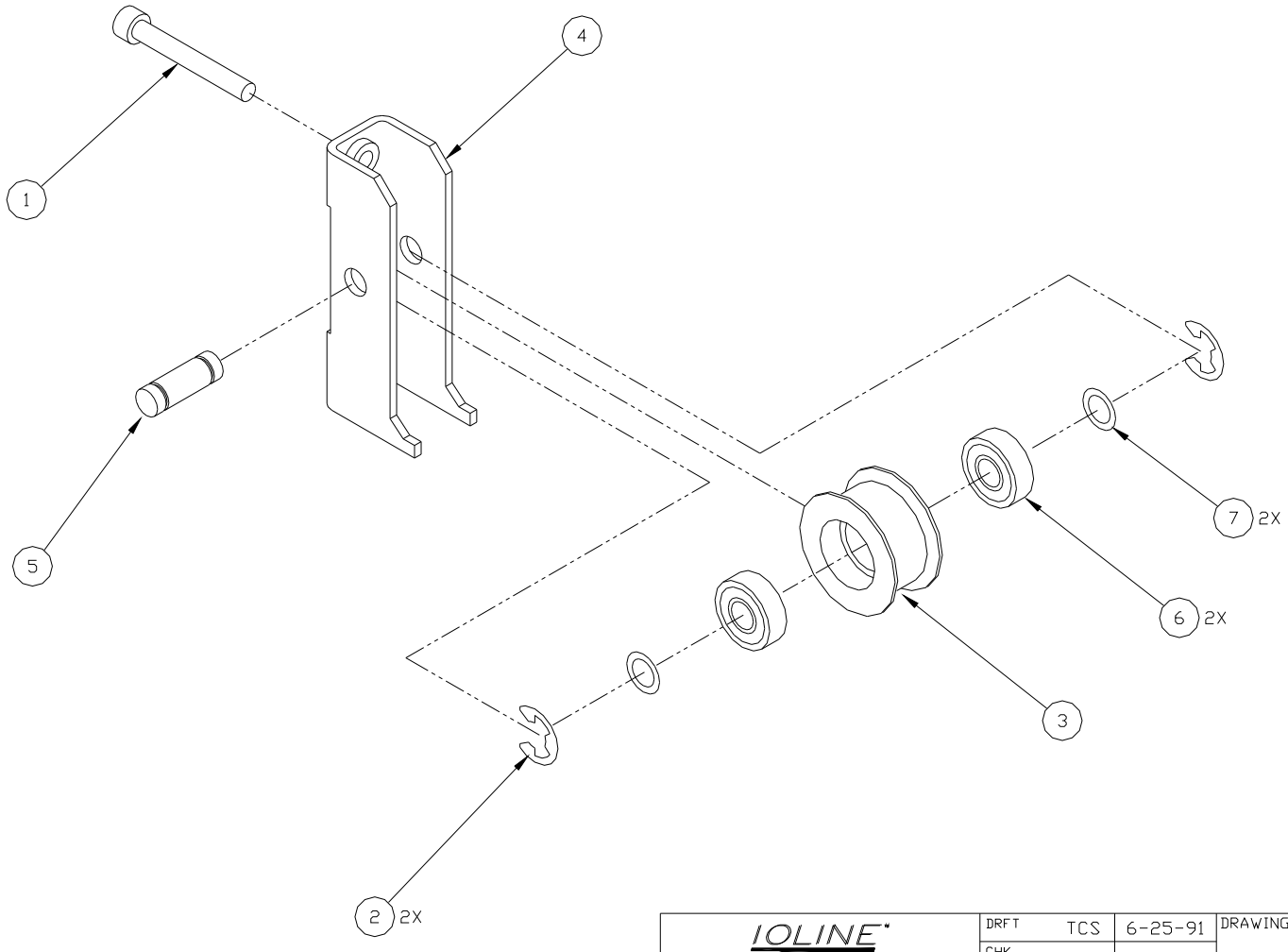
DRAWING NAME: GRIT SHAFT ASSY, X AXIS DRIVE

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ± .1
.XX = ± .03
ANGLE = ± 1° .XXX = ± .010
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
6	1 OF 1	102419

COMPONENT	COMP_DESC	PARENT	PARNT_DESC
101051-01	LABOR, SUBASSY	103826	TENSIONER ASSY
103822	PULLEY, IDLER, .25 DIA. SHAFT	103826	TENSIONER ASSY
103823	TENSIONER, Y-AXIS, .25 DIA. SHAFT	103826	TENSIONER ASSY
103824	SHAFT, IDLER PULLEY, .25 DIA.	103826	TENSIONER ASSY
100316	BEARING, BALL, .25ID, .625OD, .196	103826	TENSIONER ASSY
103825	SPACER, SHAFT	103826	TENSIONER ASSY
100046	SCREW #8-32, 1.25 LG, SHC, FULL THD	103826	TENSIONER ASSY
102222	RING, RETAINING, E-CLIP, 1/4	103826	TENSIONER ASSY

REV	ECO:	REV DATE



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DRFT	TCS	6-25-91
CHK		
ENGR		
MATL		
MFG		
QA		
SERV		
File Name:	103826	

DRAWING NAME:
TENSIONER ASSY

UNLESS OTHERWISE SPECIFIED:
Dim: INCHES Tol: .X = ±
.XX = ±
ANGLE = ± ° .XXX = ±
DO NOT SCALE DRAWING

REV	Sheet No.	Drawing/Part No.
0	1 OF 1	103826